

of the same species when more material is available or studies are made in the field.

Venezuela: Carabobo: South side of Lake Valencia, Chase 12340. Aragua: Parque Nacional, Chase 12463.

- - - - -

MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. XXIV

Harold N. Moldenke

VERBENA RIGIDA Spreng.

Verbena venosa f. umbrosa is based on a collection made by Cornelius Osten (no. 11637) in shady places on rocky hills at Solis, in the Sierra Animas, department of Maldonado, Uruguay, between November 20 and 24, 1917, and is deposited in the herbarium of the Museo de Historia Natural at Montevideo. It has greatly elongated internodes and is apparently a shade form. Verbena venosa f. genuina is based on Osten 11636 from hedges at the same locality, collected at the same time, and deposited in the same herbarium. Verbena venusta is based on a collection made by C. J. Meyer in July, 1897, at Munich, Germany, deposited in the herbarium of the University of Michigan; V. nervosa Link is based on Herb. Hort. Matrit. 33, collected from cultivated material in Spain and deposited in the herbarium of the Jardin Botánico at Madrid; and V. scabrosa is based on a collection made by Joseph Hicks Pyron at the old reservoir in Clarke County, Georgia, on July 4, and is deposited in the herbarium of Duke University. I know nothing of V. venosa var. parviflora except what is said of it by Hegi (1927): "auf Schutt beim Friedhof von Mannheim [1913]."

The species is apparently native from central Brazil south to northern Argentina, but has been introduced and become naturalized in Chile, the West Indies, Mexico, Costa Rica, the southern United States, the Azores, Madeira, the Canary Islands, England, Sweden, South Africa, India, the Pacific islands, and Australia, blooming practically throughout the year. It is widely cultivated in many parts of North and South America, the West Indies, Europe, Java, and Hawaii, introduced into cultivation in 1830. Laplace says "introduit en 1839 [in France], originaire de La Plata". Mattoon (1958) states that it is offered to the horticultural trade by Georges Delbard, Watkins & Simpson (London), Hillier & Sons (Winchester), La Germinadora, Unwin, Vaughan's (New York and Chicago), Sutton & Sons (Reading), Thompson & Morgan, Hurst & Son (London), John Forbes (Hawick), and Pearce (Moorestown, New Jersey).

It is a very showy plant, especially when forming large patches of brilliant purple, as I personally observed it in Brazil and in the southern United States. The typical form has

purple flowers — plants with a paler lilac blossom have been called var. lilacina, which see. It is not certain how many of the color variants listed above in the specific description as reported by collectors really represent different color forms and how many are merely the result of different terminology or a faulty color-sense on the part of the observers. Whether there is really a blue form or whether these reports are from collectors colorblind to red is not as yet known to me. For the record, the following are some of the collections whose labels give definite colors for the flowers: "purple" — Barclay & Purdue 744, Hassler 216a, Jürgensen 2464, Lundell & Lundell 11206, Mexia 5387a, Meyer 289, Questel 3855, Rojas 3407, Sidey 1966; "purplish" — Walther 197; "brilliant purple" — E. C. Smith s.n.; "vivid purple" — Clemens s.n.; "rich brilliant pink-purple" — Cronquist 4144; "red-purple" — Lundell & Lundell 10502; "rose-purple" — Burdick s.n.; "deep reddish-purple" — Correll & Rollins 21061; "violet-purple (no. 733 Royal Horticultural Society Colour Chart 1938--42)" — Bracelin 1306; "blue-purple" — Rodriguez 545; "violet" — Berro 2362, 5535, & 7856, Burkart 14067, Dormon s.n., Grüner 90, Harris 11969, Hatschbach 1617, Ibarrola 3393, Legrand 4189, Rodriguez 545, Rojas 13118, Schwarz 1319; "dark-violet" — Anglade 625, Osten 3864; "bright-violet" — Osten 11636; "lavender-violet" — Duncan 10646; "rose" — Sampaio 1920, Schwarz 1249; "bright-rose" — Jürgensen 2637; "dark-rose" — Jürgensen 2464; "lilac-rose" — Herb. Inst. Bot. São Paulo 870; "magenta" — Erlanson 5613; "light-lavender" — McLeod s.n.; "lilac" — Bertoni 1156, Montes 2152; "violet-blue" — Herb. Osten 17051; "red-blue" — Pickel 5165; "blue" — Herb. Inst. Bot. S. Paulo 41852, Ibarrola 3503 & 3869, Montes 1058, Pickel 5491, Ruiz Huidobro 4607 & 5083, Schwarz 2081, Venturi 2731; "dark-blue" — Venturi 2731 & 9953.

The species has numerous common names, as is to be expected for a plant so widely cultivated and introduced, among which are "camaradinha", "camaradinhas", "Felsheide", "formosa sem dote", "hardy garden verbena", "hardy garden vervain", "hardy verbena", "hardy verbena venosa", "jurupeba", "large-veined verbena", "margarita", "margarita morada", "purple vervain", "runzelblätteriges Eisenkraut", "stiff verbena", "strong-leaved vervain", "strong-veined vervain", "tall verbena", "tuber verbena", "tuber vervain", "veiny vervain", "verbena", "verbena Mammoth Mixed", "vervain", and "verveine à feuilles rugueuses". The name recommended by STANDARDIZED PLANT NAMES is "tuber verbena".

Philippi (1896) says "Es propiamente planta del Brasil meridional i de la República Argentina, i el ejemplar recojido ha nacido cerca de Santiago quizás de una semilla traída por alguna casualidad. No conviene en todos puntos con la descripción de Schauer. Su tallo tiene 80 centímetros de altura i un poco mas de 3 milímetros de grueso en la base. Las hojas son en nuestro

ejemplar bastante apartadas i no 'aproximadas', las mayores, que se hallan en el medio del tallo, miden 10 centímetros de largo i 2 1/2 centímetros de ancho, i hai unos 7 dientes de cada lado. El pedúnculo central tiene (incluso la espiga) 6 centímetros de largo, los laterales 10 centímetros. La longitud de las bracteas es de 2 1/2 milímetros, la del cáliz 5 a 6 milímetros, mientras segun Schauer las brácteas han de ser mas largas que el cáliz; la corola mide 10 milímetros. (En la obra de Gay se ha olvidado de mencionar la)." Reiche (1910) says "A esta especie brasileña i argentina se refiere una sola muestra (escapada de un jardín?) que se encontró cerca de Santiago."

Walpers (1845) classifies the species in his Section Verbenaca, Subsection Inermes, Group Foliosae, Subgroup Macranthae, and Secondary Subgroup Melindres, with 10 other species. It has been collected in both moist and dry soil, sandy waste ground, sandy or calcareous soil, weedy rich open soil, formerly cultivated soil, open dry sandy soil, and black earth, at altitudes of 3 to 2300 meters. Collectors have found it in fields and grassy places, campos and dry grassy campos, wet and shrubby campos, open fields and wet pastures, dry sandy pastures and varzea land, open places along the edge of railroads, grassy hollows and roadside banks, wet places and meadows, low woods and secondary forests, moist fields and pastures, sandy vacant lots and waste places, hedges and thickets, high campos, swamps, and grassveld, alpine meadows and damp thickets, grassy prairie-like openings, open localities, and mixed pine-oak woodlands, rocky mountains and declivities in rocky hills, shady places on rocky hills, at the edge of highways and woods, along roadsides, weedy roadsides, ditches, chalky or sandy roadsides, riversides, and railroad rights-of-way, under Eucalyptus trees, and on bare hills, grazed hilltops, Indian shellmounds, low or dry ridges, rocky plateaus, roadside banks and road embankments, dry sandy or rocky road shoulders, and coastal prairies. Often it is found in the neighborhood of human dwellings. In Misiones it has been encountered in colonies in full sunshine on the sites of recent forest fires. In Brazil it has been collected at 950 meters altitude, in Cuba at 1000 m., in Argentina from 55 to 1200 m., in India at 2000 m., and in Bolivia at 2300 m. It has been found blooming in every month of the year, and in fruit from April to December.

In Texas the species occurs in pastures and prairies and along roadsides, adventive from cultivation and very showy in large patches, in the Timber Belt, Coastal Prairies, and Blackland Prairies in the central and eastern parts of the state, from Shelby to Travis and Brazoria Counties. E. C. Smith says "forming large spreading patches of brilliant purple" in Galveston County; Tharp, Turner, & Johnston found it "in gumbo glades (a local prairie on tight marly substratum completely surrounded by pinewoods on sandy soil)" in Tyler County. Barclay & Purdue say "abundant along fences and roadsides" in Harris County, while Cory maintains "likely introduced by State Highway Dept." in Waller County. Hall found it "adventive from cultivation on prairies

at Houston" in 1872, but Bebb in 1903 says "very showy in large patches -- this must be rare -- no specimens at F. C. M. and only noted at Houston by Small." Shimmers (1958) states "rarely cultivated; found once as an escape on vacant lot in Dallas (more frequent in southeastern Texas). May--June." Coker calls it "an old garden favorite in the South". Langlois found it on the "borders of the Mississippi" and "rare on roadsides" in 1885 in Plaquemines Parish, Louisiana. Between 1878 and 1880 Mohr reported it as "extensively naturalized", "perfectly established", and "around dwellings, introduced, perfectly naturalized" in Mobile County, Alabama. Ahles found it "forming colonies on roadsides" in South Carolina.

Kuhlmann & Kuhn (1947) call V. rigida a nomophyte; Rambo found it in a region of 2 meters annual rainfall, rare snows, and a temperature of 0--25° C.; I found it abundant in dry sandy Eucalyptus woods in Rio Grande do Sul, Brazil. Thorne (1954) reports it from "roadsides and waste places, frequent"; Jørgensen found it "common on campo" at Villarica, Paraguay. Bartlett describes it from McDuffie County, Georgia, as growing on "subsoil a sandy red loam formed in situ through decomposition of the Piedmont gneisses, overlain by white sand of the Columbia formation." In Argentina Parodi found it "growing in the Andropogon lateralis zone on the climax steppe in dept. San Martín, Corrientes, along with Nothoscordum, Zephyranthes, Polygala, Cuphea, Aristolochia, Aspilula, etc." Reitz describes it as "ruderal" in Santa Catarina. Sidey refers to it as a "creeper" in the Transvaal; Anglade says "wild everywhere" in Madras; Clemens says "a vivid purple weed" and L. S. Smith says "common roadside weed, occasionally troublesome in cultivation" in Queensland, while Rosengurtt reports it as "gregarious but rare" in Uruguay.

Domin (1928) states that "In Argentinien einheimisch; in Süd-Queensland und N. S. Wales an einzelnen Stellen völlig eingebürgert, so auch in der Mulde zwischen den Tambourine und Beech Mts." In Bermuda it is described as "frequent in meadows" by Taylor and "abundant in spots as if an escape" by Collins. Neal (1948) calls it a "weed at 3000 feet" in Hawaii. Parodi (1943) says "habita en la estepa" in Corrientes and notes that he observed it planted with beautiful effect in Hyde Park, London. Troncoso (1937) reports it as cultivated in Buenos Aires. Gonçalves da Cunha & Gonçalves Sobrinho cite it from Santa Maria in the Azores. It is recorded from Bristol, England, in Proc. Bristol Naturalists Soc. 1937: 261, and is called an adventive in England by Douglas H. Kent in a letter to me dated November 28, 1949.

For those interested in plotting the spread of this species into regions other than its native ones, I submit herewith the earliest dates discovered so far by me for the species occurring in a wild state in certain areas: North Carolina -- Martin County in 1922, Northampton & Washington Counties in 1935; South Carolina -- Allendale in 1958, Barnwell County in 1962; Georgia -- Bibb County in 1888, McDuffie County in 1907, Clarke County in 1925,

Dooly County in 1928, Jackson County in 1931, Pike County in 1936, Crisp County in 1937, Greene County in 1939, Calhoun County in 1947, Clinch County in 1959, Bacon, Bleckley, Burke, Dodge, Grady, Hancock, Jeff Davis, Jefferson, Monroe, Putnam, Screven, Telfair, Twiggs, & Washington Counties in 1962; Florida -- Walton County in 1938; Alabama -- Mobile County in 1868, Sumter County in 1934; Mississippi -- Lincoln County in 1882, Claiborne County in 1925, Warren County in 1927, Forrest County in 1931, Jefferson County in 1946, Rankin County in 1950, Clarke & Pike Counties in 1955, Adams County in 1963; Louisiana -- East Baton Rouge Parish in 1874, Plaquemines Parish in 1879, Saint Tammany Parish in 1901, West Feliciana Parish in 1912, East Feliciana Parish in 1931, Saint Mary Parish in 1935, Ascension & Washington Parishes in 1937, Orleans Parish in 1958; Texas -- Harris County in 1872, Galveston County in 1895, Orange County in 1914, Walker County in 1917, Travis County in 1935, Brazoria County in 1938, Fort Bend County in 1939, Cherokee & Shelby Counties in 1941, Jefferson County in 1942, Lee & Waller Counties in 1948, Montgomery County in 1960; Bermuda -- 1905; Cuba -- 1913; Jamaica -- 1908; Guadeloupe -- 1893; Martinique -- 1901; Mexico -- 1913; Madeira -- 1865; Azores -- 1937; Sweden -- 1930; Switzerland -- 1912; New South Wales -- 1927; Victoria -- 1928; Queensland -- 1928. Undoubtedly there are earlier records, but these are the earliest noted thus far by me.

It is worth noting here that Jørgensen 2637 shows leaves rather broad and hairy. Model 298 in the Glass Flowers exhibit at Harvard University shows longitudinal and transverse sections of the ovary, stamens, pistil, and opened corolla of this species. In 1949 a specimen of V. rigida was sent to Dr. R. P. Wodehouse by a physician who stated that he had a patient with an allergy like that of poison-ivy (Toxicodendron radicans) caused by this species. Patermann (1935) reports "Zwergpollen kamen nicht zur Beobachtung" in this species.

It should also be noted here that the V. nervosa of Scheele is actually Buchnera elongata Sw. in the Scrophulariaceae, V. rugosa Michx. is a synonym of V. stricta Vent., V. rugosa Mill. is a doubtfully valid species (which see), V. rugosa Muhl. and V. rugosa Willd. are V. simplex Lehm., V. scabra Vahl is a valid species (which see) of which V. scabra Gray is a synonym, and V. scabra Muhl. is Phyla lanceolata (Michx.) Greene. In Meded. Rijks Herb. Leiden 29: 43 (1916) our plant is misidentified as V. hispida Ruiz & Pav. by Herzog. Morphological notes on V. rigida are given in Svensk Bot. Tidsk. 32: 231 (1938) and by Junell (1934). Hooker (1829) states that the fruit of this species is very like that of V. intermedia Gill. & Hook. In his 1832 work he says that V. rigida is allied to V. bonariensis L., differing in its much shorter spikes and vastly larger purple flowers. He might have added that the texture of the leaves usually is very different. Briquet in Arkiv Bot. 2 (10): 10--11 (1904) reduces his V. bonariensis var. reineckii to what we now

call V. rigida, but I am not at all sure that this variety is really invalid. In Ann. Conserv. & Jard. Bot. Genève. 7-8: 291-292 (1904) he reduces V. rigida to varietal rank under V. bonariensis, following Kuntze. He states that it is characterized by its large corollas whose tube surpasses the calyx-teeth by 5-8 mm. and whose limb measures 4-7 mm. in diameter. He claims that it represents a transition between typical V. bonariensis and his so-called var. brevibracteata and var. longibracteata, which I regard as V. intermedia Gill. & Hook.

Rümpler (1873) says of V. rigida: "Brasilien. - Einjährig, im Gewächshause ausdauernd. - Stengel vierkantig, steifhaarig, 25-40 Centimeter hoch. Blätter gegenständig, fast stengelumfassend, länglich, keilförmig, ganzrandig, gekerbt-gezähnt, runzelig, oben glatt, unten steifhaarig. Blüthen bläulich-violett, in Anfangs doldenformigen, dann verlängerten, gewöhnlich zu drei bein einander stehenden Aehren, von denen die seitlichen gestielt und kleiner. Dieses Eisenkraut kann bei der Ausstattung der Blumenbeete Verwendung finden; es blüht von Juni bis Oktober. Kultur und Verwendung wie bei Nr. 1 [V. canadensis]. Obschon diese Art länger als ein Jahr sich halten kann wenn man sie in das Gewächshaus nimmt oder aus Stecklingen erzieht, so pflegt man sie doch als Einjährige zu behandeln. Wenn man sie aber in einem gesunden Boden kultiviert, mit Glasfenstern deckt und während strengen Frostes schützt, so treibt sie im Frühjahr mit noch grössere Kraft, als im ersten Jahre und die Blüthe ist dann früher und reicher." In Gardening 1: 563 (1879) "J. H." writes that "This is a most useful plant, as it grows and flowers abundantly in almost any kind of soil or situation. It looks all the brighter for drenching rains, and lasts very late in the season. When all the ordinary varieties of Verbena fail, this one is sure to give satisfaction. It is easily kept through the winter, and if its fleshy roots are stored thickly in boxes any number of plants may be propagated in spring from the young shoots that are abundantly thrown out. It should be planted rather thickly, and pegged down until the ground is covered, when it will continue to flower until the last of the summer flowers are removed or destroyed by the frost." Potz (1964) states that 20 days are required for seed germination.

Haage & Schmidt (1898) say: "reizend, für Rabatten und Einfassungen; tres prope pour massifs ou bordures." Farrington (1934) comments that "Verbena venosa is being mentioned by growers looking for plants which have proved their value. It has been listed in the catalogues for a long time and has been grown with success by park superintendents and the gardeners on private estates, but amateurs in this section [New York] seem to have overlooked it. This verbena is distinctly different from all other kinds and produces great quantities of bright purple flowers all summer. It would be difficult to find a better subject for bedding purposes. Some garden makers have been disappointed in this verbena because they have looked upon it as a hardy perennial, certain catalogues

having listed it among the hardy plants. It is a perennial, as are most of the verbenas in warm countries, and very likely will go through the winter safely outdoors in the latitude of Philadelphia. Indeed, it has been wintered without loss on Long Island, and yet it must be considered as a tender plant and started from seeds each spring, the seeds being sown early."

Henderson (1950) lists it as among the most popular hardy perennial plants. He calls the flowers purplish-blue, "1 1/2 feet tall, blooms summers, sunny locations, any soil, useful for borders or beds." On his seed packet 4486 he says "Sow in shallow boxes of light soil in the greenhouse, hot-bed or light window in a temperature of from 60 to 70 deg., covering the seeds to a depth of only four times their size, press down with a board firmly, water with a fine spray, and do not allow the seedlings to dry out. Transplant 1 inch apart into similar boxes or 2 inch pots as they require, if plants in pots are desired, when the seedlings have formed 2 or 3 leaves, and plant out in the garden after danger from frost. They can also be sown in the open ground, after danger is over from frost." Horticulturists in general describe the plant as spreading, "1 ft. tall, covered with large panicles of purplish blue flowers from July until frost. Blooms the first year if started early. Largely used for bedding and makes a good groundcover." It is Haage & Schmidt's seed no. 5923, and Park's no. 2064. Park sells the seed at the rate of 25 cents per packet of 100, 45 cents for 200, 1/8 ounce for \$1.25, 1/4 ounce for \$2.25. Jones says "Hardy border plant, plant a few feet apart; spreads 2-3 ft., 2 ft. tall." Chittenden calls it "a good bedding plant, the tubers of which may be kept like dahlias over winter." Bailey (1935) reports that it is offered to the trade by Andorra Nurseries (Philadelphia), Borsch, Breck, Brooklyn Botanic Garden, Buist, Burnett, Burpee, Carters (London), Cheltenham, Chester Jay Hunt, Cronamere, Dreer, Ferndale Nursery (Askov, Minnesota), Floraire, Gardenside, Great Valley Mill Garden (Paoli, Pennsylvania), Haage & Schmidt, Henderson, Hocker, Hunt, Huntington, John Waterer Sons (Twynford, Berks.), Kaye, Lexington, McConnell Nursery Co. (Port Burwell, Ontario), McDonald, Michell, Mulley-Seely, Schling, Siebenthaler, Stumpp & Walter, Sutton, Thompson-Morgan, Trivetts, Vilmorin, Waterer, and Wayside. In Journ. Roy. Hort. Soc. Lond. 61: 401 (1935) it is reported that seeds were secured from Bodger Seeds (El Monte, California).

Material of *V. rigida* has been misidentified and distributed in herbaria under the names *V. angustifolia* Michx., *V. aubletia* Jacq., *V. bonariensis* L., *V. bracteata* Lag. & Rodr., *V. brasiliensis* Vell., *V. canadensis* (L.) Britton, *V. caroliniana* L., *V. chamaedrifolia* Juss., *V. hispida* Ruiz & Pav., *V. littoralis* Kunth, *V. officinalis* L., *V. phlogiflora* Cham., *V. scabra* Vahl, *V. teucrioides* Gill. & Hook., *V. venosa* var. *reineckii* Briq., *Stylodon carneus* (Medic.) Moldenke, *S. carneus* Moldenke, and *Lippia* sp. On the other hand, the Kaspiew 1469 distributed as *V. rigida* is actually *V. bonariensis* L., Archer 4821 is *V. intercedens* Briq.,

Bertoni 1156 & 2508, Montes 1058 & 9347, Pedersen 5205, Ruiz Huidobro 4607, J. G. Schwarz 1249, 1319, & 2081, and Schwindt 271 are V. rigida var. obovata (Hayek) Moldenke, and Walther 197 (at least insofar as the Britton Herbarium specimen is concerned) is Cochranea anchusaefolia (Poir.) Gürke in the Heliotropiaceae.

The reference in Loud., Hort. Brit. Suppl. 2: 680 (1839) is sometimes credited to W. Baxter, apparently in error; Sweet, Brit. Flow. Gard., ser. 2, 4: pl. 318, is often cited as "1838" and Hook., Bot. Misc. 1: 167 as "1830", also apparently in error. Perry, on page 272 of her 1933 monograph, cites the Marnock, Floricult. Mag. illustration as "fig. 2". Marnock himself so cites it on page 87 of his work, but the numbers seem to have become transposed on the illustration and the picture of V. rigida is fig. 3 — fig. 2 represents Lythrum roseum Marnock, a name apparently overlooked by the Index Kewensis.

Bauman 5, L. H. Bailey s.n. [May 17, 1930], and Herb. Univ. Calif. L. A. s.n. [Los Angeles, April 31] do not have any indication on their labels that they originated from cultivated material, but I am assuming that they did.

Pearson (1901) cites Wilms 1176 from the Transvaal and records the species from Saint Helena. Hayek (1908) cites Campos Novaes s.n. [Campinas, XII.1900], Wacket s.n. [prope Rio Grande inter Santos et urbem São Paulo], and Wettstein & Schiffner s.n. [prope S. Anna ad flumen Tieté haud procul ab urbe São Paulo, 800 m. S. m.] from São Paulo, Brazil. Troncoso (1937) cites her nos. 375, 376, & 383 from cultivated material in Buenos Aires, Argentina; Augusto (1946) cites Bornmüller s.n. [ao norte de Pindorama] and Emrich s.n., Augusto s.n., and Edésio s.n. from Rio Grande do Sul, Brazil; and Ahles (1958) cites Correll 5348 (H) from Dorchester County, South Carolina. He also cites Ahles 12368, 12581, & 15505, but these collections are cited by me (see below) as Ahles & Bell collections.

The pollen-grain description for the species is provided by Nair & Rehman (1962) based on a specimen apparently cultivated at Lucknow, India — "NBG [National Botanic Garden] 24582; Sl[ide] 2730" — not as yet seen by me.

Perry (1933) cites the following 23 additional specimens not as yet seen by me: NORTH CAROLINA: Martin Co.: Randolph 688 (G). ALABAMA: Mobile Co.: E. W. Groves 525 (E). LOUISIANA: East Baton Rouge Par.: Billings 49 (G). Saint Tammany Par.: Arsène s.n. [Covington, Aug. 1919] (W). TEXAS: Harris Co.: E. Hall 433 (E, G); E. J. Palmer 12001 (E). Walker Co.: E. J. Palmer 12038 (E). MEXICO: Vera Cruz: Purpus 6413 (E, F, G). BERMUDA ISLANDS: Main: Brown & Britton 153 (D); Brown, Britton, & Wortley 1645 (D); F. S. Collins 45 (G), 269 (G); Harshberger s.n. [nr. Devil's Hole, June 13, 1905] (D, E, G); Moore 2984 (G). Saint David's: S. Brown 693 (D). JAMAICA: W. Harris 11969 (E, G); Perkins 1024 (G).

She says "This South American species is commonly cultivated. It has escaped and established itself in various places. Kuntze and Briquet have regarded it as a variety of V. bonariensis, but lacking a considerable amount of material for examination, the writer prefers, at present, to maintain it as a specific entity." The specimen which she cites as Langlois s.n. from "NY" is cited by me hereinafter as Langlois 49 and is deposited in the Barnard College herbarium.

In all, 715 herbarium specimens and 15 mounted clippings and illustrations, including the type collections or phototypes of most of the names involved, have been examined by me.

Citations: NORTH CAROLINA: Cumberland Co.: Ahles & Hammond 24461 (Hi--104410). Duplin Co.: Ahles & Haesloop 28470 (Hi--104409). Edgecombe Co.: Radford 36843 (Hi--104408). Forsyth Co.: P. O. Schallert 570 (Ok). Johnston Co.: Radford 21836 (Hi--92950). Martin Co.: E. J. Alexander s.n. [7/28/23] (Hi--59486); Randolph & Randolph 688 (Ba, Vi). Northampton Co.: W. H. Rhoades s.n. [near Jackson, 8-1935] (Bt--61222, Dp). Onslow Co.: Ahles & Ramseur 24192 (Hi--104407). Pitt Co.: Radford 34865 (Hi--104406). Sampson Co.: Ahles & Laing 24480 (Hi--104405); Ahles & Leisner 33653 (Hi--104404). Washington Co.: D. S. Correll 1842 (Dm, Dp, H--40241, N). SOUTH CAROLINA: Allendale Co.: Ahles & Bell 12581 (Hi--92862); A. R. Moldenke 421 (Fg). Bamberg Co.: Ahles & Haesloop 22154 (Hi--146194), 25955 (Hi--104411). Barnwell Co.: A. R. Moldenke 426 (Fg). Beaufort Co.: Ahles & Bell 12368 (Hi--92863, St). Clarendon Co.: Radford 21215 (Hi--92918). Colleton Co.: Ahles & Bell 15505 (Hi--92864); C. R. Bell 2292 (Hi--92855). Fairfield Co.: C. R. Bell 7260 (Hi--93400). Horry Co.: C. R. Bell 6220 (Hi--92949). Newberry Co.: C. R. Bell 7056 (Hi--92951). Saluda Co.: Radford 23117 (Hi--92952). GEORGIA: Bacon Co.: A. R. Moldenke 344 (Fg). Bibb Co.: Eddy s.n. [Macon, May '88] (Ob--92283); A. R. Moldenke 367 (Fg); F. H. Sargent 49 (We), 59 (W--2067070). Bleckley Co.: A. R. Moldenke 374 (Fg). Burke Co.: A. R. Moldenke 409 (Fg). Calhoun Co.: R. F. Thorne 3597 (Ca--906197, N, Vi, W--1929863). Clarke Co.: Cronquist 4444 (N, Tl, W--1927651); Holder s.n. [July 7, 1929] (Gu--E.7919); B. Maguire s.n. [May 3, 1925] (Gu--E.1054); Miller & Maguire 1264 (Ua--16577); L. M. Perry 1020 (N, W--1604745); Pyron s.n. [old reservoir, July 4] (H--1698); J. M. Reade s.n. [Athens, May 26, 1928] (Ba, N). Clinch Co.: Godfrey 58558 (N). Crisp Co.: H. H. Hume s.n. [4 mi. south of Cordele, 13 May 1937] (Fl--26628). Dodge Co.: A. R. Moldenke 373 (Fg). Dooly Co.: Fattig s.n. [Vienna, 5-3-28] (Sa); W. H. Rhoades s.n. [near Vienna, July 1929] (Bt, N). Grady Co.: Cronquist 5470 (Gu--29321); A. R. Moldenke 301 (Fg, S). Greene Co.: W. H. Duncan 1570 (N). Hancock Co.: A. R. Moldenke 394 (Fg). Jackson Co.: Boyd s.n. [May 30, 1931] (Gu--E.8505). Jeff Davis Co.:

A. R. Moldenke 355 (Fg). Jefferson Co.: A. R. Moldenke 402 (Fg);
P. O. Schallert 570 (B, Hi--54946, Je--7002). Lamar Co.: Hamlin
109 (Gu--E.8028). Lincoln Co.: W. H. Duncan 10646 (No--21448).
 McDuffie Co.: H. H. Bartlett 1122 (Mi, Po--64522). Monroe Co.:
A. R. Moldenke 381 (Fg), 386 (Fg). Pike Co.: W. A. Jenkins s.n.
 [near Zebulon, 5/17/36] (Ga). Putnam Co.: A. R. Moldenke 388 (Fg).
 Richmond Co.: T. P. Cleveland 1860 (Fl--21132). Screven Co.: A.
R. Moldenke 411 (Fg). Telfair Co.: A. R. Moldenke 357 (Fg).
 Troup Co.: Biltmore Herb. 9585a (S). Twiggs Co.: Davis & Davis
11735 (Hi--115426); A. R. Moldenke 383 (Fg). Washington Co.: A.
R. Moldenke 396 (Fg). FLORIDA: Walton Co.: E. G. Hume s.n.
 [Northwest Walton Co., 5/11/38] (Fl--29766). ALABAMA: Crenshaw
 Co.: C. T. Reed 2087 (Au). Mobile Co.: Crawford, Harvill, &
Segars 1033 (Au--122635); E. W. Graves 525 (W--984440); W. H.
Harvey s.n. (W--71949); C. T. Mohr 91 (Du--90886), 125 (W--
 1323138), s.n. [Mobile, May 1868] (W--147593), s.n. [Mobile, 1875]
 (Ka), s.n. [Mobile, 1876] (W--771880), s.n. [Mobile, May 18, 1878]
 (Vt), s.n. [Mobile, 1878] (Pr, Vt), s.n. [Mobile, May 1880] (Du--
 91138), s.n. [Mobile, April 1893] (Hi--59466), s.n. [Mobile] (Mi,
 Pa). Sumter Co.: Crawford & Harvill 1071 (Au--122633); R. M.
Harper 3186 (Ba, N, Se--15932). Dauphin Island: S. B. Jones 600
 (Hi--210618). MISSISSIPPI: Adams Co.: A. R. Moldenke 734 (S).
 Claiborne Co.: F. A. Cook s.n. [Grand Gulf, June 15, 1925] (W--
 1325892). Clarke Co.: J. D. Ray 5070 (Hi--199560, N). Forrest
 Co.: F. H. Sargent s.n. [Hattiesburg, Sept. 16, 1931] (N). Han-
 cock Co.: Demaree 31888 (Sm). Hinds Co.: Mabel Parke 27583 (Tr--
 16218). Jefferson Co.: McDougall 1081 (W--1925263), 1290 (W--
 1925705); A. R. Moldenke 739 (S). Lincoln Co.: M. B. Flint s.n.
 [Brookhaven, April 15, '82] (Io--92226). Pike Co.: J. D. Ray
5459 (Hi--199685, N). Rankin Co.: Webster & Wilbur 3352 (W--
 2068074). Warren Co.: A. R. Moldenke 746 (S); W. H. Rhoades s.n.
 [near Vicksburg, July 1927; H. N. Moldenke 17081] (Br, Bt, Bt--
 30140, Ec, Hs, Hs, Ml, N, Nd, St, Va), s.n. [Cemetery, Vicksburg,
 July 1931] (Bt, N, Ob--50856), s.n. [National Cemetery, Vicksburg]
 (Hs). ARKANSAS: Craighead Co.: Demaree 24920 (Sm). LOUISIANA:
 Ascension Par.: Penfound s.n. [March 24, 1937] (Tl). Claiborne
 Par.: W. H. Rhoades s.n. [Athens] (Hs). East Baton Rouge Par.:
Correll & Correll 9118 (H--78634, N, N), 10449 (H--78936, N, N);
S. W. Hutchinson 7882 (En); Joor s.n. [Baton Rouge, June 11,
 1874] (Mi, Pa); A. L. Richardson 36 (Ur). East Feliciana Par.:
W. H. Rhoades s.n. [Ethel, July 1931] (N, Up). Orleans Par.: D.
Hummel s.n. [17/4/1958] (S). Plaquemines Par.: Langlois 49 (Bc),
s.n. [21.VII.1879] (I), s.n. [June 1880] (Ca--192902), s.n. [July
 1883] (Al), s.n. [Pointe a la Hache, 21.VII.1885] (Mi, N, Pa);

H. R. Reed s.n. [Belle Chasse, 1 May 1933] (W--1600285). Saint Mary Par.: Correll & Correll 9346 (H--78935); G. L. Fisher 35011 (Ew), s.n. [Morgan City, Apr. 21, 1935] (Gg--267618, Hp); Lambert & Lambert s.n. [September 1, 1938] (Up); Perkins & Hall 2634 (Po--256896, Um--21); W. H. Rhoades s.n. [Paterson, Aug. 1936] (Bt, N). Saint Tammany Par.: Arsène 11080 (W--1031574), 12268 (W--1033055); Bomhard s.n. [Mar. 28, 1927] (Cm); Cocks s.n. [Slidell, April 1901] (Tl), s.n. [May 10, 1901] (Tl); T. F. Hall s.n. [April 25, 1939] (Tl); A. R. Moldenke 242 (Fg); F. W. Pennell 4204 (Mi, N, Up--62326). Terrebonne Par.: Arceneaux 25 (It). Washington Par.: H. P. Riley s.n. [May 9, 1937] (Se--47523). West Feliciana Par.: Een s.n. [31.3.1951] (S); Ewan 18744 (Tl); Penfound s.n. [April 4, 1936] (Tl); F. W. Pennell 4332 (N, Up--62322). Parish undetermined: Dormon s.n. [South La., April 1930] (N). TEXAS: Brazoria Co.: H. B. Parks s.n. [Cory 29582] (N); Tharp s.n. [7/2/39] (Au, Au, Au, Mi, N, Sm). Cherokee Co.: H. J. Hamby 1764 (Ar--251841). Fort Bend Co.: Tharp 253 (Au), s.n. [7/2/39] (Au). Galveston Co.: Mally s.n. [Hulen, Sept. 22, 1895] (W--227686); Mrs. A. F. Nelson s.n. [4-20-42] (Au, N, Sm); E. C. Smith s.n. [Dickinson Bayou, 5-2-1942] (Fc). Harris Co.: C. C. Albers 35004 (Au); Barclay & Perdue 744 (Ld); R. Bebb 1240 (Ok, Ur); G. L. Fisher 460 (W--503510), 625 (W--503560), 51001 (Go, S), s.n. [May 28, 1913] (Vi), s.n. [Hosuton, Sept. 14, 1913] (Hp), s.n. [Houston, Apr. 11, 1930] (Bt--35995, Ew, Gg--222544), s.n. [Sept. 10, 1932] (Du--230450, I, Ms), s.n. [Hosuton, May 5, 1947] (B, Go); E. Hall 433 (N, Pa, Po--71137, W--227686), s.n. [Hosuton, 1872] (N); E. J. Palmer 12001 (Ca--425604); Reid 8745 (Au); Small & Wherry 11813 (N, W--1738887); Thurrow s.n. [Houston, Sept. 25, 1915] (W--865599), s.n. [Houston Heights, April 28th, 1923] (Hu); Warner s.n. [near Houston, May 20, '40] (Hu). Jefferson Co.: J. F. Brenckle 48072 (N); Lundell & Lundell 11206 (N, Rf); Parks & Cory 11282 (Tr). Lee Co.: J. F. Brenckle 48077 (N). Montgomery Co.: McLeod s.n. [near Conroe, May 15, 1960] (Au--184048). Orange Co.: M. S. Young 662 (Au, Au, Po--161331, W--1104638, Wi, Wi), s.n. [Orange] (Io--104883). San Augustine Co.: C. D. Smith 26 (Nb). San Jacinto Co.: Gould & Reeves 8230 (Au--199210). Shelby Co.: Cory 56512 (W--2007875); Lundell & Lundell 10502 (Ld, N, W--1887685). Travis Co.: Herb. Univ. Texas s.n. [Austin, 5/2/35] (Au); Tharp s.n. [Austin, 5/2/35] (Au, Bt--25423, St--9281). Tyler Co.: Tharp, Turner, & Johnston 54841 (Au--122628, St). Walker Co.: E. J. Palmer 12038 (Ca--425605); Parks & Cory 2035 (Tr), 7880 (Tr), 7881 (Tr). Waller Co.: Correll & Rollins 21061 (Ld); Cory 54253 (No--14791, Rf, St). County undetermined: C. C. Albers 39008 (Au, Au). CALIFORNIA: Sonoma Co.: M. S. Baker 7503

(Gg--218242). MEXICO: Vera Cruz: Purpus 6413 (Bm, Ca--169491, N, W--566990), 15705 (Ca--464353), s.n. [Zacuapan, May 1919] (Ca--200693). COSTA RICA: Cartago: H. Pittier 2929 (Br). BERMUDA ISLANDS: Main: S. Brown 153 (N); Brown, Britton, & Wortley 1645 (N); F. S. Collins 269 (N, W--717563); O. Degener 1301 (N), s.n. [July 24, 1921] (Ms); Harshberger s.n. [nr. Devil's Hole, June 13, 1905] (Up--43130, W--847617); McCallan s.n. [Agric. Experiment Station, July 4, 1921] (Ba), s.n. [July 1921] (Ba). Saint David's: S. Brown 693 (N, W--1341054). Saint George's: W. R. Taylor 49-1189 (Mi). CUBA: Oriente: Clément 6624 (W--1959956); Ekman 8067 (S), 8769 (S); Herb. Estac. Exp. Agronom. 14776 (Es); Hioram & Maurel 2520 (N); León 3910 (Ha, N); López Figueiras 2615 (W--2226679). JAMAICA: N. L. Britton 3176 (N); Chrysler 1401 (Ru); W. Harris 11969 (Gg--31389, N, S, W--791016), s.n. [23/10/1912] (N); W. R. Philipson 689 (N). LEEWARD ISLANDS: Guadeloupe: Duss 3470 (N, N, N); Questel 3855 (N). WINDWARD ISLANDS: Martinique: Duss 4697 (N, N). BRAZIL: Minas Gerais: Campos Porto 1839 [Herb. Rio de Jan. 26050] (B); Mello Mattos s.n. [Itabira do Campo, June 1902; Herb. Rio de Jan. 46762] (N); Mexia 5387a (N). Paraná: Dusén 3638 (Ja--46571, N, S), 7786 (N, S), 8772 (S), 8825 (N, S, W--1481762), 13329 (S), 15793 (S, W--1481767), s.n. [Herb. Rio de Jan. 3638] (N); Hatschbach 1617 (N); Mello Mattos 4702 (N); E. A. Moreira 60 (W--2369338); Stellfeld 28 [Herb. Mus. Paran. 1397] (N), 1397 (S); Tessmann 2788 (S), s.n. [Herb. Mus. Paran. 2788] (N). Rio de Janeiro: Herb. Rio de Jan. 31554 (N); Sampaio 1920 (Ja--31554), 2351 (Ja--46503). Rio Grande do Sul: Jürgens 223 (B), 451 (B), 463 (B), s.n. (B); Leite 246 (N); Lindman A.473 1/2 (N, S, S); Malme 504 (S), 504a (S), 1046 (S), 1145 (S); Moldenke & Moldenke 19689 (B, Es, F, Fy, Hw, Lg, Lm, Mg, Mr, N, No, Ot, Rs, S, Sm, Ss); Rambo 439 (N), 9990 (Sp--50992), 27143 (N), 27286 (N), 29121 (N), 34723 (S), 34727 (N, S), 51646 (W--2102123), 51647 (S), 57248 (S); Reineck & Czermak 68 [Herb. Osten 4158] (N, S, Ug); A. R. Schultz 409 (N); Schwacke 2759 [Herb. Saldanha 5070] (Ja--46580); Sehnem 3505 (B, Gg--356411, N); J. Vidal s.n. [Allemoa, March 1939] (Ja--46558), s.n. [Santa Maria do Boca do Monte, March 1939] (Ja--46547, Ja--46549). Santa Catarina: Dusén 17889 (S); Moreira & Moreira 235 (Gg); Reitz 4515 (Rd), C.1407 (N), C.1497 (N, S); Schwacke 183 [Herb. Mus. Nac. Rio ref. no. III] (Ja); L. B. Smith 5810 (W--2120177, Z); Smith & Klein 7488 (N, Ok, W--2251284); Smith & Reitz 10200 (W--2249368). São Paulo: Araujo 4 (Sp--24000); Brade 5742 (N, S, Sp--6714), 5769 (S); Campos Novaes 918 (W--389888); Campos Porto 2983 [Herb. Rio de Jan. 32605] (B, N); Dedecca s.n. [Herb. Inst. Agron. S. Paulo 8150] (Be--37287); Edwall s.n. [Capital, Oct. 18, 1893; Herb. Com. Geogr. & Geol. 653] (N, Sp--15673); Herb. Jard. Bot. Rio de Jan.

1406 (N); F. C. Hoehne s.n. [Butantan, Nov. 7, 1917] (N, Sp--870), s.n. [Itapira, May 14, 1927] (Sp--20304), s.n. [Serra Negra, June 1, 1927] (Sp--20644), s.n. [Serra Negra, June 3, 1927] (N, Sp--20696); Hoehne & Gehrt s.n. [Caraguatatuba, Dec. 8, 1939] (N, Sp--41852); Kiehl & Castro s.n. [Herb. Inst. Agron. S. Paulo 3777] (N, W--1775580); Kiehl & Franco s.n. [Herb. Inst. Agron. S. Paulo 5161] (N, Sp--44300); M. Kuhlmann 77 (Sp--47879), 481 (N); Leite 3726 (El); B. Lutz s.n. [Serra da Bocaina, Jan. 1925] (Ja--15093); Luederwaldt s.n. [Ipiranga; Herb. Mus. Paulista 92] (N, Sp--15716); Pickel 1760 (N, Sf), 1878 (Sf), 5165 (Sp, Sp--44947), 5491 (N); Russel 104 (N, Sp--20064); Sampaio 4395 (Ja--46507); Santoro 735 (N), s.n. [Campinas, 28 Feb. 1936; Herb. Inst. Agron. S. Paulo 392] (Ba, N, W--1593220), s.n. [Herb. Inst. Bot. S. Paulo 735] (W--1594593); Usteri s.n. [Capital, 1905; Herb. Polytech. S. Paulo 247b] (N, Sp--15711); Viegas & Zagatto s.n. [Jaguari, 10 Jan. 1939; Herb. Inst. Bot. S. Paulo 3792] (W--1775583). State undetermined: Sellow 428 (Vt), s.n. [Bras. merid.; Macbride photos 17444] (Br, F--photo, Kr--photo, N, N--photo, N--photo, N--photo, N--photo, Si--photo, Vt, Z--photo, Z--photo), s.n. [Brasilia] (N). BOLIVIA: Chuquisaca: Troll 53 (B). Santa Cruz: Cárdenas 5192 (W--2250729); T. Herzog 1696 (S); Steinbach 6052 [Herb. Inst. Miguel Lillo 38012] (N). PARAGUAY: Fiebrig 6305 (W--1134887); Grosse & Lindman 3899 (Ja--28233); Hassler 1560 (N), 6508 (N, S); Jørgensen 3770, in part (N, S, W--1483809), 3790 (Du--197902); Kuntze s.n. [Sud Paraguay, IX.92] (N, N, W--701064); Lindman A.3899 (N, S); A. Lutz 1482 (Hk); Morong 1541 (C); T. Rojas 3407 [Herb. Osten 18195] (Ug), 13118 (N), s.n. [Hassler 216a; Herb. Osten 15645] (N, Ug). URUGUAY: Archer 4452 (W--1705455); Arechavala s.n. [Herb. Osten 3747] (Ug); H. H. Bartlett 21005 (Mi); Berro 2362 (N), 5535 (N), 7856 (N); Cantera 34 (Ug, Ug, Ug); Castellanos s.n. [Playa Atlántida, Dec. 29, 1946; Herb. Inst. Miguel Lillo 15164] (N, N), s.n. [Arroyo Catalancito, Jan. 30, 1948; Herb. Inst. Miguel Lillo 15049] (N); Collector undesignated s.n. [Marzo 10 de 1885] (Ug), s.n. (Ug, Ug); Hauman s.n. [Montevideo, XI/1922] (Br); Herter 268c [Herb. Herter 80738] (He), s.n. [Herb. Osten 17051] (Ug); Kuntze s.n. [Sierra de Solis, Nov. 1892] (N, N, N); Légrand 3492 (Ug), 4189 (Ug); Lombardo 442 (N); Müller & Melchers s.n. [Herb. Inst. Miguel Lillo 11762] (N); Osorio s.n. [Valle Eden, Feb. 19, 1947] (N, Ug--13851); Osten 3864 (Ug), 5302 (W--1134904), 11636 (Ug), 11637 (Ug), 16049 (Ug); Rosengurt B. 1920 (N, N, Ug--5609), B.2705 (N), B.2869 (N), B.3035 (N), B.5301 (W--2048512), s.n. [H. N. Moldenke 11203] (N); Schröder s.n. [Herb. Osten 19454] (Ug); Tappen s.n. [Herb. Osten 5302] (Ug). ARGENTINA: Buenos Aires: Gillies s.n. [Macbride photos 34349]

(Kr--photo, N--photo); Parodi 7382 [Herb. Osten 20939] (Ug). Chaco: Jørgensen 2464 [Herb. Inst. Miguel Lillo 31553; Herb. Osten 11869] (N, Ug); T. Meyer 289 (Ug--10941); A. G. Schulz 1480 (N); Venturi 5 (W--1043590). Córdoba: A. T. Hunziker 7134 (N). Corrientes: Ibarrola 3393 (N), 3505 (N), 3869 (N); Parodi 12623 (N). Entre Ríos: T. Meyer 10097 (N). Formosa: Jørgensen 2637 [Herb. Osten 14553] (Ug). Misiones: Bertoni 2009 (Au--122637, N), 2961 (N, Rf); Burkart 14067 (N), 14762 (W--1858339); Ekman 1981 (S), 1982 (Mi, N, S), 2028 (S); Grüner 90 [Herb. Osten 23177] (Ug); Lilliesköld s.n. [vicinity of Colonia Bonpland] (S); Medina 37 (N); Montes 665 (Bm, S), 2152 (N); D. Rodríguez 545 [Herb. Inst. Miguel Lillo 31558] (Ca--3316, N, Ug--4935, W--1858284); Ruíz Huidobro 5083 (N); Sandeman 4792 (K); G. J. Schwarz 1299 (N, S). Tucumán: Venturi 2731 [Herb. Osten 17251] (N, S, Ug, W--1591265). ZORES ISLANDS: Faial: Persson s.n. [3/5/1937] (Go). MADEIRA: J. Bornmüller 1140 (Br); Gonçalves da Costa s.n. [S. Martinho, Maio 1937] (Go); Mandon s.n. [23 Feb. 1865] (N); E. Wall 5 [12/329] (Ew), 5 [28/329] (Ew). SWEDEN: A. Andersson s.n. [Sept. 1932] (Gg--222543); Blom s.n. [Göteborg, 14/9/1930] (Go, S, S). SWITZERLAND: H. Beger s.n. [Zurich, 13.7.12] (B); R. Probst s.n. [27.8.30] (Pb). REPUBLIC OF SOUTH AFRICA: Basutoland: Dieterlen & Dieterlen 997 (Br). Cape of Good Hope: E. Wall 5 [Douglas] (Ew); Sidey 1165 (S). Transvaal: T. J. Jenkins s.n. [XII.1911; Herb. Transvaal Mus. 10933] (Z). Province undetermined: Krook s.n. [Penther 1764] (S, S). INDIA: Madras: Anglade 625 (Ca--262525); Bembower 319 (Ca--495740, N), 386 (Mi); E. W. Erlanson 5613 (Mi, N); Meebold 11522 (S), 11592 (S); Saulière 267 (Ba--23745, Ba--23746). WESTERN PACIFIC ISLANDS: RYUKYU ISLAND ARCHIPELAGO: Okinawan Islands: Okinawa: Walker, Tamada, & Amano 5976 (N). HAWAIIAN ISLANDS: Hawaii: G. R. Ewart III.193 (Bi); Hosaka 2247 (Bi, Bi). AUSTRALIA: New South Wales: Herb. Prager 18626 (Gg--31285); A. Morris 2229 (N); Rodway 327 (Gg--229701); Tilden 610 (Bl--42352, Cm); Valentin s.n. [Dec. 12, 1927] (S). Queensland: M. S. Clemens s.n. [Oct. 12, '43] (Or--47763), s.n. [March 1947] (Or--55498), s.n. [Maryborough, October 1948] (Mi); Cribb & Newton s.n. [Mount Glorious, Nov. 1950] (Bm); C. E. Hubbard 4824 (S); L. S. Smith 3068 (N). Victoria: Valentin s.n. [24/3/1928] (S). CULTIVATED: Argentina: Ruíz Leal 13861 (Ss). Belgium: Herb. Jard. Bot. Brux. s.n. (Br); Lejeune s.n. [hort. Millet 1838] (Br); M. Martens s.n. (Br). Brazil: F. C. Hoehne s.n. (N, Sp--15721). California: Bailey & Bailey 7750 (Ba); Bracelin 1306 (Gg--339914, Go), 2307 (Gg--347732, Go, N); Eastwood s.n. [San Francisco, May 20, 1915] (Gg--31387), s.n. [San Francisco, Aug. 1919] (Gg--31388); C. Hart s.n. [May 20, 1930] (Gg--174603); Herb. Univ. Calif. Los Angeles

s.n. [September 7, 1943] (La), s.n. [Los Angeles, April 31] (La); S. W. Hutchinson s.n. [15 August 1937] (En, La); K. D. Jones 1642 (Gg-177510); E. Kemp s.n. [Sacramento, 9.V.35] (Ca-591525); Walther 197 (N). Dominican Republic: J. de J. Jiménez 4631a (Jz). England: L. H. Bailey s.n. [Kew, Aug. 8, 1919] (Ba); Herb. Roy. Hort. Soc. Garden Wisley s.n. [July 8, 1936] (Ba); Nemes 1152 (Ba); Stearn s.n. [Moldenke & Moldenke 9157] (N). France: Laplace 3888 (La), s.n. [Duffour 3888] (Vi). Germany: Collector undesignated 2109 (S); "H. G." 26 (Bm); Herb. Martius s.n. [h. Monac. 1840] (Br), s.n. (Br); Herb. Prager 18641 (Gg-31425); C. J. Meyer s.n. [München, Juli 1897] (Mi); Muhlbach s.n. [Potsdam, 7 August 1942] (B). Hawaiian Islands: C. H. Hitchcock s.n. [Kauai] (Dt). Illinois: E. E. Green s.n. [Garfield Park, July 24, 1935] (Ba); Herb. Div. Floric. Univ. Ill. 273 (Ur), 274 (Ur), 869 (Ur). India: Herb. Hort. Bot. Calcutt. s.n. (Bz-23747). Italy: Herb. Harvey s.n. [hort. Ballovacens, jun. 1842] (Du-166457); Vignolo-Lutati s.n. [VI.1931] (N). Java: Hallier D.588a (Bz-23742, Bz-23743), D.588b (Bz-23744); Herb. Hort. Bot. Bogor. XV.K.A.XLV.5 (Bz, Bz-26430), 11 (Bz, Bz-26438). Maryland: W. H. Cowgill 568 [U. S. Pl. Introd. 121505] (Oa-9236); McCann s.n. [9-15-36] (Md). Massachusetts: L. H. Bailey s.n. [Cambridge, Aug. 31, 1921] (Ba), s.n. [Cambridge, August 6-12, 1929] (Ba); Leavitt s.n. [Cambridge, 11 Oct. 1898] (Rf, Rf). Michigan: Kniper 7191 (Mi). New Jersey: H. N. Moldenke 9289 (N). New York: L. H. Bailey s.n. [Sept. 25, 1922] (Ba), s.n. [C. U. greenhouses, May 7, 1923] (Ba), s.n. [C. U. gardens, Aug. 14, 1925] (Ba), s.n. [Ithaca, Oct. 10, 1934] (I), s.n. [Vilmorin-Andrieux & Cie. seed 80080] (Ba); Bastedo s.n. [21.S.1897] (N); Burdick s.n. [Sept. 26, 1922] (Ba); Kalergi s.n. [7/24/42] (N); H. N. Moldenke 8074 (N), 10611 (N); Moldenke & Moldenke 11891 (N); Nanton s.n. [9/3/40] (N); G. V. Nash s.n. [N. Y. Bot. Gard. Cult. Pl. 44553] (N), s.n. [22.S. 1898] (N); R. C. Schneider s.n. [N. Y. Bot. Gard. Cult. Pl. 26941] (N); L. S. Slater s.n. [August 24, 1922] (Al); Van Melle s.n. [Poughkeepsie, 1931] (Ba); M. Zimmerman 54 (Ba). North Carolina: L. H. Bailey s.n. [May 17, 1930] (Ba); W. C. Coker s.n. [Oct. 2, 1936] (Hi, Hi-58481); P. O. Schallert s.n. [9/30/38] (Ky). Oklahoma: O. H. Calvert 219 (St-24365). Pennsylvania: I. Burk s.n. (Up-17129); Martindale s.n. [July 1876] (Pr). Peru: Soukup 2912 (N). Russia: Herb. Hort. Bot. Petrop. s.n. (W-71948). Spain: Herb. Hort. Matrit. 33 (Q). Sweden: Alm s.n. [18.VIII.1947] (Bm); Bauman 5 (Ew); Blom s.n. [1931] (Go); Herb. Mus. Bot. Stockholm s.n. [1844] (S); Regnell s.n. [7/1897] (S); Reuter s.n. [13/9/1886] (Go); Trolander s.n. [Juli 1935] (Ew); E. Wall 5 [18/844] (Ew), 5 [26/841] (Ew), s.n. [24/740] (Ew). Switzerland: Herb. Hort. Basil. s.n. [Jun. 1830] (Mi), s.n. [Aug. 1839]

(M). Texas: E. Hall s.n. (W--71978). LOCALITY OF COLLECTION UN-
 DETERMINED: Collector undesignated 49 (Q); Dunlop s.n. [Aug.
 1890] (Mi); Dusén 64 (Ja--46561); R. T. Lowe 990 [Valle Garden]
 (Pa); Miers s.n. [Zanjon, Desmochadez] (Bm); Tweedie s.n. (S).
 MOUNTED ILLUSTRATIONS: Gard. Chron., ser. 3, 76: 279, fig. 99.
 1924 (Ba); G. V. Nash s.n. [N. Y. Bot. Gard. Cult. Pl. 44553] (N);
 fig. 25690 (N). MOUNTED CLIPPINGS: Gard. Chron., ser. 3, 76: 279.
 1924 (Ba).

VERBENA RIGIDA var. ALBA (Trivetts) Moldenke in Chittenden, Roy.
 Hort. Soc. Dict. Gard. 6: 2212. 1951.

Synonymy: Verbena venosa alba Trivetts, Cat. Suppl. 1933 Nov-
 elty List 6. 1933; Moldenke, Alph. List Invalid Names Suppl. 1:
 27 [as "Triretts"], in syn. 1947; Moldenke, Résumé 378, in syn.
 1959.

Bibliography: Trivetts, Cat. Suppl. 1933 Novelty List 6.
 1933; L. H. Bailey, Cat. Florists Handl. Verbenac., mss. 1935;
 Moldenke, Alph. List Invalid Names Suppl. 1: 27. 1947; Moldenke
 in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2212. 1951; Molden-
 ke, Journ. Calif. Hort. Soc. 15: 80. 1954; Moldenke, Résumé 224,
 378, & 473. 1959.

Haec varietas a forma typica speciei corollis albis recedit.

This variety differs from the typical form of the species in
 having white corollas.

Bailey (1935) lists this as only offered to the horticultural
 trade by Trivetts, but I am not certain that the reference given
 above is actually the original publication by Trivetts. In my
 1947 publication I accidentally misspelled the author name as
 "Triretts" and reduced the trinomial to synonymy under V. rigida
 Spreng.

As yet I have not seen any material which was definitely this
 variety.

VERBENA RIGIDA var. GLANDULIFERA Moldenke, Phytologia 6: 331.
 1958.

Synonymy: Verbena rigida f. glandulosa Moldenke ex J. A.

Clark, Card Index Gray Herb. issue 229. 1958.

Bibliography: Moldenke, Phytologia 6: 331. 1958; J. A. Clark,
 Card. Index Gray Herb. issue 229. 1958; Moldenke, Résumé 111 &
 473. 1959; Angely, Fl. Paran. 16: 79 (1960) and 17: 47. 1961;
 Moldenke, Résumé Suppl. 7: 9. 1963.

This variety differs from the typical form of the species in
 having the peduncles, rachis, bractlets, and calyxes densely
 glandular-puberulent, and the bractlets only very shortly and
 sparsely ciliolate.

The type of the variety was collected by Gert Hatschbach (no.
 4212) along the roadside at Laranjeiras do Sul, in the municipal-
 ity of Guarapuava, Paraná, Brazil, on November 15, 1957, and is
 deposited in the Moldenke Herbarium at Yonkers, New York. Only 2
 herbarium specimens, including the type, have been examined by me.

Citations: BRAZIL: Paraná: Hatschbach 4212 (Z--type), 4213 (Ok).

VERBENA RIGIDA var. LILACINA (Benary & Bodger) Moldenke, *Phytologia* 5: 133. 1955.

Synonymy: Verbena venosa lilacina Benary & Bodger ex Harrow, *Journ. Roy. Hort. Soc. Lond.* 61: 401. 1935. Verbena rigida var. lilacina Hort. ex Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 74 & 102. 1942. Verbena venosa lilacina Dreer ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 27, in syn. 1947; Pearce, 1964 *Garden Aristocrats* 20. 1964. Verbena rigida lilacina Moldenke in Chittenden, *Roy. Hort. Soc. Dict. Gard.* 6: 2209. 1951. Verbena rigida lilacina Hort. ex Moldenke, *Résumé Suppl.* 3: 40, in syn. 1962.

Bibliography: Purdy, *Perenn. Pl.* Fall 1928 Spr. 1929, p. 53. 1928; Farrington, *N. Y. Herald Trib.* April 29. 1934; Harrow, *Journ. Roy. Hort. Soc. Lond.* 61: 401. 1935; L. H. Bailey, *Cat. Florists Handl. Verbenac.* mss. 1935; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 74 & 102. 1942; Moldenke, *Alph. List Invalid Names Suppl.* 1: 27. 1947; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 164 & 199. 1949; Moldenke in Chittenden, *Roy. Hort. Soc. Dict. Gard.* 6: 2209 & 2212. 1951; Moldenke, *Journ. Calif. Hort. Soc.* 15: 80. 1954; Moldenke, *Phytologia* 5: 133. 1955; Moldenke, *Biol. Abstr.* 30: 1092. 1956; Moldenke, *Résumé* 224, 373, 378, & 473. 1959; T. H. Everett, *New Illustr. Encycl. Gard.* 13: pl. 11-11a. 1960; Moldenke, *Résumé Suppl.* 3: 29 & 40 (1962) and 7: 9. 1963; Pearce, *New High-lights in Fls.* 20. 1963; Pearce, 1964 *Garden Aristocrats* 20. 1964.

Illustrations: T. H. Everett, *New Illustr. Encycl. Gard.* 13: pl. 11-11a [in color]. 1960.

This variety is said to differ from the typical form of the species in having its corollas lavender-blue or very pale lavender-lilac, rosy-lilac, "near to sky-blue", or mineral violet (no. 635/3 in the Royal Horticultural Society Colour Chart, 1938--42).

The plant is described as growing 1 to 2 1/2 feet tall, and has been collected in anthesis in June in California.

It is not at all certain how much variation there actually is in the color of the flower of this horticultural variety, and how much of the apparent variation mentioned above is due to varying color-concepts in the minds of botanical and horticultural observers and collectors, or even to color-blindness. It may well be that some or many of the specimens cited under typical V. rigida Spreng. actually belong in this variety and that some of the apparent color variations listed there actually belong here.

The first description of the variety known to me is the one by Purdy (1928) who has this to say of it: "hardy, with quite a little cold. It propagates by underground runners to make masses. The flowers are lilac and quite pretty." He charged 25 cents per plant, \$2.50 per dozen plants. Farrington (1934) is the first person known as yet to me to have published the varietal epithet,

but this was done in a newspaper column and therefore is of doubtful nomenclatural standing. He says of the plant "A variety of this verbena which is somewhat new is called Venosa lilacina and will be prized for its color, a very delicate shade of lavender blue. Like the original venosa, it is good for beds and borders, and even for the rock garden."

In my 1942 work I used the name "Verbena rigida var. lilacina Hort." before I had determined the basynym. Even now, it is not at all certain to me that the variety should be credited to Benary & Bodger in the 1935 reference given above. It may very well have been named and described earlier by these authors elsewhere, or by someone else even earlier.

Harrow (1935) says of it: "Characters of V. Venosa, but flowers very pale lavender-lilac", and that the seeds were obtained from Benary & Bodger. Bailey (1935) states that it is offered by Dreer and by Schling. Pearce (1963) calls it a verbena "of merit..... usually grown as annuals.....perennial in mild climates.....12". Showy long-bloomer, near to sky-blue. Tubers will winter-store" and sells it for 25 cents per package of seeds.

Only 2 herbarium specimens definitely of this variety have been examined by me.

Citations: CULTIVATED: California: Bracelin 2113 (Gg--347724, Go).

VERBENA RIGIDA var. OBOVATA (Hayek) Moldenke, Rev. Sudam. Bot. 5: 2. 1937.

Synonymy: Verbena rigida f. obovata Hayek in Engl., Bot. Jahrb. 42: 162. 1908.

Bibliography: Hayek in Engl., Bot. Jahrb. 42: 162. 1908; Moldenke, Rev. Sudam. Bot. 5: 2. 1937; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 102. 1942; Moldenke, Alph. List Invalid Names Suppl. 1: 26. 1947; Moldenke, Alph. List Cit. 1: 264. 1946; Moldenke, Phytologia 2: 337. 1947; Moldenke, Castanea 13: 119. 1948; Moldenke, Alph. List Cit. 3: 781 & 782 (1949) and 3: 1256. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99, 100, 107, & 199. 1949; Moldenke, Résumé 111, 118, 120, 128, 373, & 473. 1959; Moldenke, Résumé Suppl. 7: 6. 1963.

This variety differs from the typical form of the species in having its leaf-blades in general quite decidedly obovate, rather obtuse at the apex, widest above the middle, narrowly cuneate to the abruptly rounded base. The corolla is described as violet or red-violet to purple, lilac, rose, or blue.

The type of this variety was collected by Emil Hassler (no. 8911) in the vicinity of Caaguazu, Paraguay. The variety has been found in medium-dry to moist generally sandy grasslands, on campos, in thickets and arroyos, and along riverbanks, from 200 to 900 meters altitude, blooming from December to April, June, July, September, and October, and fruiting in June. Herbarium material has been misidentified and distributed under the names V. rigida Spreng. and V. venosa Gill. & Hook. The variety is not well-marked and it is possible that some of the specimens cited by me

under typical V. rigida, especially those from Paraguay and Misiones, actually belong here.

In all, 30 herbarium specimens, including the type collections of all the names involved, and 2 mounted photographs have been examined by me.

Citations: BRAZIL: Santa Catarina: Smith & Klein 11968 (W--2251838, Z). PARAGUAY: Hassler 6508 (Ca--944359), 8911 (N--isotype, N--photo of isotype, V--isotype, Z--photo of isotype); Pedersen 5205 (S). URUGUAY: Osten 6569 (Ug), s.n. [near Piriapolis, March 30, 1911] (Ug). ARGENTINA: Misiones: Bertoni 1156 (N), 1513 (Ca--164687), 2508 (N); Ekman 1973 (Ml, N, S); T. Meyer 6659 (Ut--115408b); Montes 1058 (N, N), 2404 (N), 9347 (Au--122909, Lu, Lu); J. G. Schwarz 1249 (N, S, S), 1319 (N), 2081 (N); Schwindt 271 (N). San Mateo Island: Rufz Huidobro 4607 (Au--122636, N, Ok).

VERBENA RIGIDA var. REINECKII (Briq.) Moldenke, Phytologia 2: 150. 1946.

Synonymy: Verbena venosa var. reineckii Briq., Ann. Conserv. & Jard. Bot. Genève. 3: 164. 1899. Verbena bonariensis var. reineckii Briq., Arkiv Bot. 2 (10): 10, in syn. 1904. Verbena rigida var. latifolia Hassler ex Moldenke, Résumé 373, in syn. 1959.

Bibliography: Briq., Ann. Conserv. & Jard. Bot. Genève. 3: 164. 1899; Briq., Arkiv Bot. 2 (10): 10--11. 1904; Moldenke, Phytologia 2: 150. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 22 & 28. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 78. 1948; Moldenke, Alph. List Cit. 4: 1247. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99 & 199. 1949; Moldenke, Phytologia 3: 454. 1951; Moldenke, Résumé 111, 118, 359, 373, 378, & 473. 1959; Moldenke, Résumé Suppl. 3: 15. 1962.

This variety differs from the typical form of the species in having its leaves much thinner in texture, much less firm and rigid, more broadly elliptic in shape, and less scabrous above, the venation much less prominent beneath.

The plant is described by collectors as suffrutescent, 0.8--1 m. tall, with blue-purple flowers.

The type of the variety was collected by Eduard Martin Reineck and Josef Czermak (no. 55) at Belém Velho, Rio Grande do Sul, Brazil, on October 31, 1897, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. I have not as yet seen the type, but the several collections cited below apparently represent the same taxon. The type of var. latifolia was collected by Teodoro Rojas (no. 3365) at the edge of woods at the foot of Cerro Acahy, Carapeguá, Paraguay, in April, 1919, and is deposited in the herbarium of the Museo de Historia Natural at Montevideo. Reineck & Czermak 68 [Herb. Osten 4158] in the Montevideo herbarium is inscribed "Verbena venosa var. reineckii var. nov.", but appears to represent the typical form of the species.

The variety has been found in swamps, on hillsides, and at the

edge of woods, flowering in April. Material has been misidentified and distributed in herbaria under the name V. venosa Gill. & Hook.

Briquet (1904) cites the Ann. Conserv. & Jard. Bot. Genève. 3: 164 reference as "1898" and states that he named this taxon as a variety of V. bonariensis L. there, which is not so. He also notes "La distinction que nous avons faite en 1899 entre le V. venosa Gill. et Hook. type et une variété Reineckii basée sur la forme des environs de Porto Alegre, ne résiste pas à l'examen de matériaux abondants. Nous y voyons plutôt maintenant une simple forme locale."

In all, 7 herbarium specimens and 4 mounted photographs have been examined by me.

Citations: PARAGUAY: T. Rojas 3365 [Herb. Osten 18171] (N, N, Ug), s.n. [Hassler 216; Herb. Osten 15646] (Ag--photo, F--photo, N--photo, Ug, Z--photo). ARGENTINA: Corrientes: Ibarrola 3869 (Gg--353275); G. J. Schwarz 2081 (Gg--352678). Misiones: Medina 37 (Gg--353274).

VERBENA RINCONENSIS Moldenke, Phytologia 9: 100. 1963.

Bibliography: Moldenke, Phytologia 9: 100. 1963; Moldenke, Résumé Suppl. 6: 4. 1963; Moldenke, Biol. Abstr. 43: 643. 1963.

Creeping herb; stems slender, rooting, mostly procumbent; branches ascending, very slender, rather sparsely pilose with rather stiff and divergent white hairs; principal internodes elongate, 2--9 cm. long; nodes not annulate; leaves decussate-opposite, very variable in size and shape, petiolate; petioles slender, 5--11 mm. long, rather sparsely spreading-pilose with erect whitish hairs, more or less margined, especially toward the apex; leaf-blades thin-chartaceous, rather uniformly bright-green on both surfaces, ovate, 1.5--3.5 cm. long, 1.5--2.5 cm. wide, irregularly incised, the larger ones 3-lobed, rather sparsely pilose on both surfaces, the lobes and divisions oblong or ovate, mostly acute or subacute at the apex; inflorescence terminal, abbreviated, 1.5--5.5 cm. long, subcapitate in anthesis, elongate-cylindric in fruit; peduncles slender, 1--3.5 cm. long, densely white-pilose with wide-spreading rather stiff hairs; bractlets narrow-lanceolate, 4--6 mm. long, mostly divergent or even recurved, attenuate-acute at the apex, pilosulous on the back, long-ciliate; calyx cylindric, about 7 mm. long, rather densely subappressed-pubescent on the outer surface, plainly 5-ribbed, the teeth 5, subulate, 2 long and 3 shorter; corolla hypocrateriform, blue, its tube about 8 mm. long, venose and pilosulous on the outside toward the apex, the limb to 7 mm. wide.

The type of this species was collected by George B. Hinton (no. 8011) on a hill at Rincón, in the district of Temascaltepec, México, Mexico, on August 29, 1935, and is deposited in the herbarium of the Texas Research Foundation at Renner, Texas. The collector describes the plant as procumbent, growing on a clay hill at 1960 meters altitude, flowering in February, March, and

August. It has in the past been confused with and distributed as V. pumila Rydb.

In all, 11 herbarium specimens, including the type, have been examined by me.

Citations: MEXICO: México: Hinton 5589 (N, W--1822244), 8011 (Ca--939134--isotype, K--isotype, Ld--isotype, N--isotype, Rf--type), 8988 (K, Ld, N, W--1822294).

VERBENA RIPARIA Raf., Herb. Raf. 69, nom. nud. 1833; Small & Heller, Mem. Torrey Bot. Club 3: 12. 1892.

Synonymy: Verbena urticaefolia riparia Britton, Mem. Torrey Bot. Club 5: 276. 1894. Verbena urticifolia var. riparia Britton apud Perry, Ann. Mo. Bot. Gard. 20: 267, in syn. 1933. Verbena urticaefolia var. riparia (Raf.) Britton ex Moldenke, Suppl. List Invalid Names 10, in syn. 1941. Verbena urticaefolia var. riparia Britton ex Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947.

Bibliography: Nutt., Gen. 2: 40. 1818; Raf., Herb. Raf. 69. 1833; Small & Heller, Mem. Torrey Bot. Club 3: 12. 1892; N. L. Britton, Mem. Torrey Bot. Club 5: 276. 1894; Durand & Jacks., Ind. Kew. Suppl. 1: 451. 1906; Robinson & Fern. in A. Gray, New Man. Bot., ed. 7, 688 & 924. 1908; M. A. Day, Check List 128. 1908; N. Taylor, Mem. N. Y. Bot. Gard. 5: [Fl. Vic. N. Y.] 525. 1915; Perry, Ann. Mo. Bot. Gard. 20: 247, 259, 267, & 356. 1933; J. K. Small, Man. Southeast. Fl. 1137. 1933; Moldenke, Prelim. Alph. List Invalid Names 46 & 49. 1940; Moldenke, Suppl. List Invalid Names 10. 1941; Moldenke, Alph. List Invalid Names 47 & 51. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 4 & 102. 1942; Moldenke, Alph. List Cit. 1: 293 & 391. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 27. 1947; Moldenke, Alph. List Cit. 2: 470 & 508 (1948) and 3: 941 & 942. 1949; E. D. Merr., Ind. Raf. 205 & 295. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 6, 7, & 199. 1949; Fern. in A. Gray, Man. Bot., ed. 8, 1209, 1210, & 1612. 1950; Moldenke in Gleason, New Britton & Br. Illustr. Fl., print. 1, 3: 126--128 (1952) and print. 2, 3: 126--128. 1958; Moldenke, Am. Midl. Nat. 59: 347. 1958; Moldenke, Résumé 9, 10, 366, 377, & 473. 1959; Moldenke, Résumé Suppl. 1: 1 (1959), 4: 20 (1962), and 7: 10. 1963; Gleason & Cronquist, Man. Vasc. Pl. 579 & 580. 1963; Moldenke, Phytologia 8: 488 (1963), 9: 52, 93, 203, 204, & 220 (1963), and 10: 217 & 218. 1964.

Illustrations: Moldenke in Gleason, New Britton & Br. Illustr. Fl., print. 1, 3: 128 (1952) and print. 2, 3: 128. 1958.

Annual herb; stems 6--15 dm. tall, erect, sparsely pubescent or glabrate, widely branched; leaves petiolate, oblong to ovate, 4--14 cm. long, 1- or 2-pinnatifid or nearly tripartite toward the base, sparsely strigillose on both surfaces, the venation prominent beneath; spikes slender, elongate, paniculately disposed; bractlets lanceolate-ovate, as long as the calyx during anthesis, acuminate at the apex; calyx to 3 mm. long, minutely

glandular-pubescent, subtruncate, the teeth minute; corolla light-blue or bluish to lavender, its tube mostly over 3 mm. long, slightly longer than the calyx, puberulent outside, its limb 3.5 mm. wide, the lobes more or less rounded, the middle posterior one emarginate or notched at the apex; cocci oblong or ellipsoid, 2--2.5 mm. long.

The species has been found in rich thickets, on riverbanks, and on the banks of streams, very local in distribution, at an altitude of 2100 feet, flowering and fruiting in June and July. Fernald, Small, and Perry all report that it grows in New Jersey, but cite no specimens from that state and I have not seen any from north of Virginia.

The name, Verbena riparia, is usually accredited to Rafinesque "ex Small & Heller, Mem. Torrey Bot. Club 3: 12. 1892", as, for instance, by Durand & Jackson (1906) and Perry (1933), but according to E. D. Merrill (1949) it was first published by Rafinesque himself (1833), although as a nomen nudum. Small & Heller (1892) give "1830" as the date for the original publication, but Merrill does not seem to substantiate this. They also claim that Rafinesque's type is preserved in the Columbia University herbarium, but I have not been able to locate it there. Merrill claims that Rafinesque based his name on material from "Long Island, New Jersey, & Chesapeake Bay", which is most amazing, since this species is known to me only from Virginia and North Carolina. Nuttall's type of V. hastata var. oblongifolia does not enter the picture because this name is only placed here in synonymy with a question by Small & Heller when Rafinesque's name was validated by a description -- this description being based on two North Carolina collections which apparently should be considered the real co-types of the species.

The original description by Small & Heller is reproduced here: "Verbena riparia, Raf. (1830). V. hastata, L., var. oblongifolia, Nutt., Genera ii, 40 (1818)?....This brings to light another species which Rafinesque collected and named many years ago. The type is preserved in the Columbia College Herbarium, and it seems strange, but it is evident that neither Dr. Gray nor Dr. Engelmann ever saw it, for no reference is made to it in their respective works on the genus. We found it in the mountains on the banks of the John's river and in the low country at the falls of the Yadkin, in both cases true to the name which Rafinesque gave to it."

According to Harry Ahles, in a letter to me dated May 1, 1963, the first of these localities ("in the mountains on the banks of the John's river") lies in Caldwell County, North Carolina. The Small & Heller unnumbered collection, cited below, from "near Globe", is probably the actual collection here referred to and is regarded by me as the logotype of the species. Globe is situated on the John's River near the junction of Anthony Creek, in Caldwell County. The second locality ("in the low country at the falls of the Yadkin") was in Stanly County. Ahles says "The 'Falls of the Yadkin' referred to by Small were on the Yadkin River, in

Stanly Co., North Carolina, and are also referred to as the 'Rapids of the Yadkin'. They were apparently in the vicinity of Badin, North Carolina, but are now under high water from a dam that was placed on the river just below there.....In Mem. Torr. Bot. Club 3: 20-21 (1892-1893) Small mentions the Falls of the Yadkin as in the lowlands (actually Piedmont), and further states he got there by going from Salisbury to Gold Hill, thence to the Falls. This would seem definitely to tie it into the area about Badin." This specimen has not yet been seen by me.

The original Rafinesque reference reads: "Autikon Maritimum. Collection of 44 new or rare Plants from the Atlantic shores of Long Island, New Jersey, and the Chesapeake, the Sea Islands and the Pine Barrens, discovered or collected by myself between 1802 and 1833". The name, Verbena riparia, is listed without further description.

Nuttall's description reads as follows: "4. hastata. Flowers deep blue; rarely if ever hastate. Of this species there appears to be a very distinct variety near Philadelphia which I shall distinguish by the name of β .* oblongifolia, having oblong-lanceolate deeply serrated leaves, merely acute, and not acuminate; spikes filiform, paniculate; flowers smaller, pale blue. May this be V. paniculata of Lamarck? but the flowers are not imbricated, nor in the least corymbose, it appears to be equally remote from V. diffusa of the same, but assuredly intermediate, if not a hybrid betwixt V. hastata and V. urticifolia. It has only occurred to me twice on the banks of the Delaware." It seems to me much more likely that Nuttall's plant is xV. engelmannii Moldenke, as, indeed, Rafinesque's original plant may well also have been. I cannot agree with previous authorities who have placed Nuttall's name in the synonymy of V. riparia.

Dr. Small apparently also collected V. officinalis L. on the Middle Fork of the Holston River, near Marion, Smyth County, Virginia, on July 6, 1892 (which see). The leaves of the V. riparia material are considerably larger than those on the V. officinalis specimens. Fernald (1950) distinguishes these two very closely related species as follows: V. officinalis — mature calyx 2—2.5 mm. long, twice as long as the subtending bractlet; corolla purple; mature schizocarp nearly as broad as long. V. riparia — mature calyx 3 mm. long, about as long as the subtending bractlet; corolla bluish; mature schizocarp twice as long as broad.

Material of V. riparia has been misidentified and distributed in herbaria as V. scabra Vahl. Taylor (1915) reduces the species to synonymy under V. urticifolia L.

Perry (1933) cites the following 4 additional specimens not as yet seen by me: VIRGINIA: Smyth Co.: J. K. Small s.n. [Marion, 6 July 1892] (E, G). NORTH CAROLINA: Caldwell Co.: Small & Heller s.n. [near Globe, July 3, 1891] (F). Stanly Co.: Small & Heller s.n. [near falls of Yadkin, 18 Aug. 1891] (F). She says "The ma-

terial at hand is too scanty and too immature to give many clues to the probable relationship of this species. It would seem as nearly related to V. officinalis as to either V. hastata or V. urticifolia. It is characterized by pinnatifid or tripartite leaves, minutely glandular-pubescent inflorescence, and fruit about twice as long as thick."

In all, 34 herbarium specimens, including the type, have been examined by me.

Citations: VIRGINIA: Smyth Co.: J. K. Small s.n. [near Marion, June 22, 1892] (Au, I, N, Ok), s.n. [Middle Fork, Holston River, Marion, July 1, 1892] (Ba, Ba, Ba, Cm, Cn, Fl--11173, Gg--163147, H--35984, Hi--59475, N, Ob--50829, P, Po--69312, Up, Up, W--298398, We), s.n. [Middle Fork, Holston River, Marion, July 6, 1892] (Al, C, C, Fc, Io--20755, Ob--50828, Ot, W--71939), s.n. [July 20, 1892] (Up), s.n. [near Marion, July 22, 1892] (Ca--25188). Ragged Island: Fernald & Long 12453 (N). NORTH CAROLINA: Caldwell Co.: Small & Heller s.n. [near Globe, July 3, 1891] (C--logotype). LOCALITY OF COLLECTION UNDETERMINED: Herb. Bot. Mus. Lund. s.n. [North America] (Lu).

VERBENA ROBUSTA Greene, Pittonia 3: 309. 1898.

Synonymy: Verbena prostrato-stricta Palmer ex Moldenke, Résumé Suppl. 7: 9, in syn. 1963.

Bibliography: Greene, Pittonia 3: 309. 1898; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 191. 1904; Jepson, Man. Flow. Pl. Calif. 859 & 1236. 1925; Perry, Ann. Mo. Bot. Gard. 20: 248, 261, 292--293, & 356. 1933; Munz, Man. So. Calif. Bot. 437. 1935; Eastwood, Leaflet West. Bot. 3: 71. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 15, 19, 80, & 102. 1942; Jepson, Fl. Calif. 3 (2): 382. 1943; Moldenke, Known Geogr. Distrib. Verbenac. Suppl. 1: 2. 1943; Bowerman, Flow. Pl. Ferns Mt. Diablo 49, 51, 71, 72, & 221. 1944; Moldenke, Alph. List Cit. 1: 2, 43, 57, 109, 169, 177, 191, 193, 209, 220, 221, & 243. 1946; Moldenke, Phytologia 2: 326 & 330. 1947; Moldenke, Castanea 13: 113. 1948; Moldenke, Alph. List Cit. 2: 397, 398, 439, 455, 469, 474, 475, 477, 482, 483, 488, 491--495, 523, 526, 570, 571, 584, 587, 597, & 617 (1948), 3: 732, 766, 792, 841, 843, 859, 892, 946, 948, 976, & 977 (1949), and 4: 980, 982, 989, 1126, 1127, 1133, 1135, 1138, 1139, 1155, 1198, 1199, 1223--1227, 1229, 1230, 1237, 1239, 1240, 1244, 1245, 1247, 1252, 1253, & 1290. 1949; H. S. Gentry, Allan Hancock Pacif. Exped. 13 (2): 33 & 244. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 3, 27, 28, 33, 164, & 199. 1949; Moldenke, Phytologia 3: 141 (1949) and 3: 284. 1950; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209 & 2212. 1951; Moldenke, Am. Midl. Nat. 59: 344. 1958; Moldenke, Résumé 5, 33, 40, 224, & 473. 1959; Moldenke, Phytologia 8: 120 & 144 (1961) and 8: 278 & 279. 1962; Moldenke, Résumé Suppl. 3: 9 (1962), 5: 5 (1962), 6: 3 (1963), and 7: 9. 1963; Raven, Aliso 5: 302 & 336. 1963; Moldenke, Phytologia 8: 487 (1963) and 9: 17, 34, & 215. 1963.

Erect or semi-erect perennial, 1 1/2 to 5 feet tall, sometimes with a 3-foot spread, often stiffly erect, harshly hairy throughout, sometimes very floriferous and with the herbage quite glandular; stems sharply 4-angled, branched from the base, usually 6--9 dm. tall, erect, sturdy, robust, paniculately branched above, glabrate or sparsely hirsute; branches ascending or erect, leafy; leaves decussate-opposite, ovate or oblong-ovate, 4--10 cm. long, rounded at the apex, cuneately narrowed toward the base and into the winged petiole, bright-green on both surfaces, usually 3-cleft, irregularly serrate-dentate with sharp apiculate teeth or incised, usually rugose and scabrous-pubescent above and less harshly pubescent beneath or very rough to touch and scabrous-hirtous on both surfaces, the venation prominently reticulate; inflorescence showy; spikes paniced, often crowded, subsessile, thick, usually densely many-flowered even after anthesis but occasionally elongated, densely glandular-hispidulous throughout; bractlets lanceolate-subulate, equaling or surpassing the calyx, densely glandular-hirtellous; calyx 3--4 mm. long, densely glandular-hirsute, its lobes obtusish, terminating in very unequal acuminate-subulate teeth; corolla hypocrateriform, varying from purple or purplish to lilac, lavender, or violet, its tube 5--6 mm. long, a little longer than the calyx, puberulent on the outer surface, hairy inside, its limb 3--4 mm. wide; fruit mostly contiguous; cocci oblong-trigonous, 2--2.5 mm. long, raised-reticulate above, the striae fading out toward the base, the commissural faces more or less muricate, approximately extending to the tip of the coccus.

The type of this species was collected by Edward Lee Greene on "dry hills about San Francisco Bay, especially near Point Isabel on the eastern shore and on Pt. Tiburon", Marin County, California, "flowering in the middle of the dry season". The Greene collection cited below from this same county may represent a cotype or isotype. The type of V. prostrato-stricta was collected by Edward Palmer at San Luis Obispo, in the county of the same name, California, in 1876, and is deposited in the United States National Herbarium at Washington.

Verbena robusta differs from the closely related V. lasio-stachys Link in having its corolla 5--6 mm. long, the limb 3--4 mm. wide, the bractlets lanceolate, acuminate, as long as the calyx, the leaves harshly pubescent, the habit strictly erect, and the commissural surface of the cocci densely beset with minute cylindric processes. It has been found growing in semishade in dry streambeds, rocky loam, marshy ground, fallow fields, moist soil near the mouth of canyons, dry or rocky creek beds, creek bottoms, small canyons, small ravines, gravel, salt marshes, dry clay soil around rocks, and drainage ditches in fields, at the edge of swamps, the mouths of small creeks, and springs in serpentine barrens, and on hills, dry hills, foothills, flats, sunny moist slopes, streambanks, canyon floors, and beach dunes, at altitudes of 5 to 3500 feet, flowering from April to December and fruiting from May to December. Abbott found it "common on low ground", Clokey encountered it in a "wash in streambed near

sea level". Twisselmann says that it is "scarce in mud of small pool, broken off by cattle, in full sun, in Upper Sonoran subshrub association"; Fosberg also found it "in dry creekbed in Upper Sonoran Zone." Ewan 9726 is described by the collector as follows: "herbage viscid, subslimy, plants 5 feet tall, deep gravel alluvium, leaves roughish." Bowerman (1944) says that it is "common on the margins of springs, rarely in streambeds, 500 to 3000 feet [on Mt. Diablo], June to October" associated with Juncus effusus, J. patens, Oenothera hookeri, Anagallis arvensis, and Helenium puberulum. She describes the inflorescence as "small heads of lilac flowers". A common name recorded for the species is "Catalina vervain".

Material of this species has been misidentified and distributed in herbaria under the names V. bracteosa Michx., V. ciliata Benth., V. hastata L., V. lasiostachys Link, V. lasiostachys var. scabrida Moldenke, V. polystachya H.B.K., V. prostrata R. Br., V. scabra Vahl, V. stricta Vent., and even Rumex sp. On the other hand, the Murbarger 218 and R. A. Plaskett 142, distributed as V. robusta, are actually V. lasiostachys Link, while V. F. Hesse 2606 and R. A. Plaskett 98 are V. lasiostachys var. septentrionalis Moldenke. E. K. Abbott s.n. [Monterey, 1889] is a mixture with V. abramsi Moldenke, while M. W. Williams 15 is a mixture with a species of Salvia. Wiggins & Demaree 4741 is not typical -- the spikes are thin -- nor is Grant s.n. [Avalon, Aug. 6, 1902], both originally determined as V. lasiostachys var. scabrida. Rattan s.n. [Shell Mound Park, June 1880], Ferris 7656, R. J. Smith 13, and Clokey 5041 have the leaf-blades smooth (not scabrous) above. The last two of these collections are very hairy and look much like a possible hybrid with V. lasiostachys, as, in fact, the Clokey specimen in the Dudley Herbarium was actually annotated by someone. Howell 40044 is very floriferous and showy, with the herbage quite glandular.

Gentry (1949) states that the species "apparently originated on Catalina and migrated to the mainland". He claims that it is found on the Channel Islands of San Miguel, Santa Rosa, Santa Cruz, Santa Catalina, and San Clemente. Peter H. Raven, however, in a letter to me dated November 30, 1962, says "Gentry's record is undoubtedly based on that of Eastwood, Leaflet West. Bot. 3: 71. 1941. Miss Eastwood clearly states that she is including V. prostrata as reported from the islands in her concept of V. robusta, so this record is clearly based in turn on that of Munz, Manual Southern California Botany, p. 437. 1935, which correctly lists 'V. prostrata' from San Clemente Island alone, of all the California islands. Therefore, the picture seems clearly to indicate that only V. lasiostachys is on San Clemente Island, only V. robusta on San Miguel, Santa Catalina, Santa Cruz, and Santa Rosa islands." The species was apparently introduced into cultivation in 1843. Jepson (1943) cites many specimens.

Perry (1933), under V. prostrata R. Br., cites the following 3 additional specimens not as yet seen by me: CALIFORNIA: Siskiyou Co.: E. L. Greene 860 (E, F, G). Under V. robusta she cites the following 19 specimens not as yet seen by me: CALIFORNIA: Alameda Co.: Congdon s.n. [salt marshes, Oakland, Sept. 1886] (G); Engelmann s.n. [valley back of Berkeley, 23 Oct. 1880] (E); E. L. Greene s.n. [West Berkeley, May 1887] (W); Michener & Bioletti 123 (G). Amador Co.: Braunton 1263 (E). Marin Co.: Eastwood s.n. [Tiburon, July 26, 1900] (G). San Diego Co.: Edw. Palmer 310 (E, F), s.n. [Jamez Valley, 26 June 1875] (G). San Luis Obispo Co.: Edw. Palmer 341 1/2 (F, G). San Mateo Co.: Elmer 4950 (E). CHANNEL ISLANDS: Santa Catalina: J. I. Carlson s.n. [Avalon, June 13, 1915] (E, G); Macbride & Payson 850 (G); Trask s.n. [Avalon, Sept. 1896] (E), s.n. [Avalon, May 1897] (F). MEXICO: Baja California: C. R. Orcutt 1301 (E); Wiggins & Gillespie 3977 (E). The Palmer 310 which she cites from "NY" is actually in the Barnard College herbarium and the 341 1/2 is in the Columbia University herbarium. The E. L. Greene s.n. which she cites from "US" is probable the E. L. Greene 78 cited by me hereinafter. She has annotated Braunton 99 in the United States National Herbarium as "atypical". She says "Verbena robusta has been much confused with the nearly related V. prostrata, but is quite readily distinguished from the latter by the brighter green color of the herbage, the scabrous upper surface of the leaves, and the usually dense spikes. Moreover, the mature calyx lacks the marked tendency toward subconnivent lobes, a characteristic of V. prostrata. The schizocarps of the two are very much alike. The collection Orcutt 1301 has a greatly elongated inflorescence and the leaves are not particularly scabrous. The specimens Braunton 99 and 1263 show unusually long floral bracts. These are probably atypical phases of the species or possibly hybrids." Another possibility is that they may represent V. lasiostachys var. scabrida Moldenke.

In all, 227 herbarium specimens, including the types or topotypes of all the names involved, have been examined by me.

Citations: CANADA: Nootka Island: Née 90 (Q). CALIFORNIA: Alameda Co.: M. S. Baker 10504 (Ca--804538); J. W. Blankinship s.n. [Berkeley, July 22, 1891] (Ca--397406); Brandt s.n. [Berkeley Hills, July 9, 1914] (Ca--176060), s.n. [Wildcat Canyon, July 16, 1914] (Ca); Chesnut s.n. [Oakland] (Ca--35053); Collector undesignated s.n. [Oakland] (Sg--16088); Eastman s.n. [near Livermore, Nov. 1898] (Ca--104873); E. L. Greene 78 (W--1323142); J. T. Howell 19838 (Gg--204484), 18173 (Gg--319113); Jepson 12935 (Ca); C. H. Michener s.n. [Temescal, Aug. 1891] (Ob--50821); Michener & Bioletti 1886 (Ca--35053), s.n. [Oakland, Aug. 1891] (Ur), s.n. [Leona, Aug. 6, 1892] (C, Ca--25157, Pl--22601, Pl--22603), s.n.

[Berkeley, Aug. 9, 1892] (Ur); Rattan s.n. [Shell Mound Park, June 1880] (Du--12891); H. A. Walker 696 (Ca--450180). Amador Co.: Braunton 1263 (N). Contra Costa Co.: Bowerman 371 (Ca--691729), 393 (Ca--691535), 464 (Ca--691756), 481 (Ca--691578); K. Brandegee s.n. [betw. Martinez & Port Costa, July 4, 1907] (Ca--139763); Ewan 9726 (Ca--723797, En, En, Rs--22314); J. T. Howell 1440 (Gg--172421); H. S. Yates 4069 [U. S. Dept. Agr. Forest Serv. 5601] (Ca--124419). Kern Co.: G. H. Horn s.n. [in Owens Valley and at Fort Tejon] (N); Twisselmann 1535 (Gg--391009). Los Angeles Co.: Blake 704 (Ur); Braunton 99 (W--465104); Epling & Epling s.n. [Mint Canyon, May 1925] (La); G. B. Grant 5305 (Du--75581), s.n. [June 17] (Du--75651); Knoche 879 (Du). Marin Co.: Eastwood s.n. [Tiburon, July 26, 1900] (Ca--104872); H. Edwards s.n. [Lagunitas Reservoir, 4/77] (N), s.n. [Saucilito, Apr. '77] (N); E. L. Greene s.n. [23 July 1891] (I); Jepson 21230 (Ca), s.n. [Tiburon, July 20, 1891] (C). Mendocino Co.: Eastwood 9328 (Gg--31347), 10647 (Gg--31337). Merced Co.: Abrams 5295 (Du--67811). Monterey Co.: E. K. Abbott s.n. [Monterey, 1889] (Mn--23135, N), s.n. (Gg--31344); Belshaw 2731 (Ca--570390); Eastwood & Howell 5808 (Gg--256912, Se--49973); J. T. Howell 23360 (Gg--354231, S), 39595 (B), 40043 (Z), 40044 (B); L. S. Rose 35605 (N). Napa Co.: J. T. Howell 5599 (Gg--181600); Raven 3953 (Gg--386303). Orange Co.: Ewan 3612 (En), 7691 (En); F. R. Fosberg 5146 (S). San Benito Co.: J. T. Howell 11527 (Du--219218, Gg--212584); Raven 8855 (Gg--408147); Rodda s.n. [Pinnacles, May 16, 1926] (Gg--140322). San Bernardino Co.: E. L. Greene s.n. [Highland Station, Aug. 7, 1887] (W--56191). San Diego Co.: Abrams 3787 (N); Cleveland s.n. [Sweetwater Valley, June 15, 1885] (N, W--2053934); Epling, Darsie, Knox, & Robison s.n. [Flin Springs, June 19, 1932] (Ca--520076, En, La); Gander 222 (Sd--11633), 251.3 (Sd--12197), A.226 (Ba); Edw. Palmer 310 (Bc, Pa); S. G. Stokes s.n. [Mesa, Aug. 1895] (Du--24210). San Francisco Co.: Goodspeed s.n. [1887] (Io--108903). San Joaquin Co.: Suksdorf 3 (Pl--138411). San Luis Obispo Co.: K. Brandegee s.n. [Lagoon] (Ca--185316); "I. J. C." s.n. [Nov. 22, 1907] (Ca--456151); R. J. Ferris 7656 (Du--206261); Edw. Palmer 341 (Pa), 341 1/2 (C, Pa, W--56223); Mrs. R. W. Summers s.n. (N); Wiggins 3618 (Du--278558, Se--60137); C. B. Wolf 3614 (N, Rs--18236). San Mateo Co.: W. R. Dudley s.n. [Oct. 24, 1897] (Du--278637, Du--278638); H. A. Dutton s.n. [Feb. 18, 1900] (Du--104441); Elmer 4950 (Ca--306773, Du--68489, Gg--31341, N, Or--15935, Pl--81730, Po--64686, W--665836); J. T. Howell 14745 (Gg--269702); L. H. Pammel s.n. [La Honda, Sept. 13, 1921] (Io--103251); L. W. Reinecke s.n. [Redwood City, June 13, 1937] (Ca--770046); Schreiber 307 (Ca--615560); Suksdorf 304 (Pl--138409). Santa Barbara Co.: Eastwood 868 (Gg--31368), s.n. [Zaca

Mt., June 17--22, 1902] (N); Morton 8698 (W--2179026); J. Torrey 416 (T); M. W. Williams 44 (Mn--35079). Santa Clara Co.: Abrams 1032 (Du--143857); J. B. Davy 278 (Ca--25163), 289 (Ca--25162); W. R. Dudley s.n. [Sept. 14, 1901] (Du--278636), s.n. [Oct. 10, 1908] (Du--24180); F. W. Johnson 524 (N); C. P. Smith 1155 (M1); R. J. Smith 13 (Du--77583). Santa Cruz Co.: C. A. Reed s.n. [April 10, 1919] (Gg--31339). Siskiyou Co.: E. L. Greene 860 (Bc, Pa). Solano Co.: Jepson 20250 (Ca), s.n. [Alamo Creek, June 8, 1884] (Ca--25154). Sonoma Co.: J. B. Davy 865 (Ca--25159); E. Samuels 161 (Ky). Tuolumne Co.: R. Stinchfield 28 (Du--67519, N); Mrs. W. J. Williamson 189 (Du--100490, Gg--31345, Po--63841). County undetermined: Edw. Palmer 342 (C). Angel Island: E. Cannon s.n. [Angel Island, Marin Co., Aug. 11, 1893] (Gg--31363). CHANNEL ISLANDS: Santa Catalina: K. Brandeggee s.n. [May 1916] (Ca--185415); J. I. Carlson s.n. [Avalon, April 28, 1914] (Gg--31369, W--880594), s.n. [Avalon, June 13, 1915] (Gg--31366, W--1070618); Dunkle 1955 (Hp, Po--155674); Eastwood 6500 (Gg--31367, W--1100481); F. R. Fosberg S.4606 (N), S.4741 (Ca--882793, N), S.4843 (Ca--625012, Ca--882792, I, N, S, W--1766310), S.5412 (Ca--625057, Ca--882794, En, I, N, Up, W--1766351); G. B. Grant s.n. [Avalon, Aug. 6, 1902] (Du--91161); Poumey s.n. [Sept. 17, 1894] (Ca--104871); Trask s.n. [Avalon, May 1897] (W--340303), s.n. [Avalon, Aug. 1901] (N); C. B. Wolf 3605 (Du--300754, Rs--3588), 3612 (Ca--729757, Du--300760, Rs--3595, W--1845569). Santa Cruz: Balls 11838 (S); T. S. Brandeggee s.n. [1888] (Ca--169224); Clokey 5040 (Ca--882809, N), 5041 (Ca--535403, Ca--882796, Cm, Du--261238, En, Mi, Mn--23679, Mn--28445, N, Pl--110261, Po--201017, S, Ua--22838, Um--53, Um--58, Up, Ur, W--1601449); Collector undesignated 38-291/38-292 (M1); F. H. Elmore 291 (Ak--11028); M. E. Jones s.n. [Valdez Bay, 9-5-27] (Po--172767, Ua--14843); Mrs. W. W. Rand 26 (Gg--179175); Swain s.n. [1919] (Gg--31348); Thatcher s.n. [May 1921] (Ca); M. W. Williams 15, in part (Gg--310872), 45 (Du--289568); C. B. Wolf 4160 (Ca--882808, Gg--381235, Rs--5594). MEXICO: Baja California: C. R. Orcutt 1301 (C, Ca--25167, W--1323121); Wiggins & Demaree 4741 (Du--215395, W--1588012); Wiggins & Gillespie 3977 (Du--196037, Gg--179399, Me, Me, Mi, N, Ob--50824, Po--193808, Rs--19050, W--1491295). CULTIVATED: Sweden: Herb. Mus. Bot. Stockholm s.n. [1843] (S).

VERBENA RUGOSA Mill., Gard. Dict., ed. 8, no. 18. 1768 [not V. rugosa D. Don, 1836, nor Michx., 1947, nor Muhl., 1809, nor Sweet, 1845].

Bibliography: P. Mill., Gard. Dict., ed. 8, no. 18. 1768; J. Sm. in Rees, Cycl. 36: no. 7. 1817; Steud., Nom. Bot., ed. 2, 2: 750. 1841; Walp., Repert. 4: 33. 1845; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; Moldenke, Known Geogr. Distrib. Verbenac., [ed.

1], 19 & 102 (1942) and [ed. 2], 33 & 199. 1949; Moldenke, Résumé 40 & 473. 1959; Moldenke, Résumé Suppl. 7: 8. 1963.

Nothing is known to me about this plant except Miller's original description: "Verbena (rugosa) diandra, spicis ovatis, foliis subrotundis serratis & rugosis, caule fruticoso ramoso. Vervain with two stamina to the flowers, oval spikes, roundish, sawed, rough leaves, and a shrubby branching stalk. Sherardia arborescens nodiflora foliis serratis & rugosis flore purpureo, Houst. MSS. Tree-like Sherardia with a purple flower, and rough, sawed leaves....The eighteenth sort was discovered by the late Dr. Houstoun growing naturally at Campeachy, from whence he sent the seeds to England; this has a strong woody stalk, which rises ten or twelve feet high, covered with a light brown bark, and sends out many ligneous branches on every side, which are garnished with roundish, sawed, rough leaves, of a light green colour, standing upon short foot-stalks. The flowers are small, of a pale blue colour, and are collected into oval heads, standing upon naked foot-stalks which spring from the wings of the branches; these seldom appear in this country, and are not succeeded by seeds here; but the plants are easily propagated by cuttings during the summer months, and may be preserved many years in a moderate stove."

Walpers (1845) places it in his group of species at the end of the genus known by name only. Obviously, with only two stamens, it cannot be a true Verbena. I suspect that it will prove to be a Stachytarpheta. Schauer apparently does not list it either among his valid or excluded species. Smith (1817) seems to regard it as a synonym of V. simplex Lehm., which is not very probable.

VERBENA RUNYONI Moldenke, Phytologia 2: 25—26. 1941.

Synonymy: Verbena runyonii Moldenke apud Plant. Exsicc. Gray. 1274 (in sched.). 1942; Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947; Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209 & 2212. 1951.

Bibliography: Moldenke, Phytologia 2: 25—26. 1941; Moldenke in Lundell, Fl. Texas 3 (1): 16 & 27. 1942; A. M. T. Davis, Study Boscaje Palma 62. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 13 & 102. 1942; Moldenke, Alph. List Cit. 1: 111, 125, 126, 200, 288, & 297. 1946; Moldenke, Phytologia 2: 166 (1946) and 2: 328. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 26. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 80. 1948; Moldenke, Wrightia 1: 225—227. 1948; Moldenke, Alph. List Cit. 2: 407, 453, 457, & 494—496 (1948), 3: 678, 681, 683, 806, 822, 873, 882, 883, & 939 (1949), and 4: 981, 989, 1060, 1184, 1213, 1218, & 1230. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 24, 27, 164, & 199. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209 & 2212. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Résumé 30, 32, 224, 373, & 474. 1959; Moldenke, Résumé Suppl. 7: 3. 1963; Moldenke, Phytologia 10: 179. 1964.

Tall, erect, coarse, annual or perennial herb, usually 18--24

inches tall; stems erect, green, rather stout, sharply tetragonal or square, hollow, larger below, sparsely hirsutulous with short whitish divergent hairs especially on the angles and at the nodes, glabrescent in age, more or less scabrellous on the angles; bark green or dark-green; roots fibrous; internodes elongate; leaves decussate-opposite, sessile, clasping, dark-green, oblong in outline, 2--6 cm. long, 0.8--3 cm. wide, more or less 3-parted or -lobed, each division pinnatifid-incised with broad acute teeth, abundantly hirsutulous on both surfaces with rather short whitish hairs which are bulbous-based on the upper surface and wear off there, leaving the upper surface scabrous on older leaves; inflorescence terminal, spicate, compound or clustered, the branches slender, erect, 14--25 cm. long, rather closely many-flowered, often bearing 1--3 pairs of much reduced leaves near the base, the flowers close together near the top of the spike, with a faint odor or odorless, very densely imbricate before and during anthesis, rather uniformly separated in fruit; peduncles (2--6 cm. long) and rachis slender, sharply tetragonal, rather densely or sparsely spreading-pilose or -pubescent, glandular, the pubescence very short; bractlets linear-lanceolate, about 3 mm. long, equaling the calyx, sharply attenuate, rather sparsely puberulent and glandular, the margins sparsely and irregularly ciliolate toward the base; calyx tubular, about 3 mm. long, glandular-pilose with short spreading hairs; corolla blue or light-blue to lavender, lavender-blue, violet, or purplish, about 6 mm. long, its tube puberulent at the apex on the outer surface, the limb about 4 mm. wide.

The type of this species was collected by Robert Runyon (no. 2485) -- in whose honor it is named -- in clay soil in open moist ground and ditches in the El Jardin Tract, at an altitude of 10 meters, Cameron County, Texas, on April 2, 1941, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is closely related to V. xutha Lehm., which differs notably in its dense long-strigose or hirsute non-glandular pubescence throughout, especially on the bractlets and calyx, and which inhabits dry instead of uniformly moist ground. Runyon says about V. runyonii: "rare in this region: it occurs in moist ground, never in dry fields", "occasional: it occurs only in moist ground", "occasional in semi-dry fields", and "abundant in springtime". Hanson reports that it is "frequent in openings in woods", while F. B. Jones calls it "locally abundant" in Nueces County. Other collectors have found it in open or open moist ground, clay, clay-loam, or black, often heavy, soil, in ditches and roadside ditches, woods, chaparral, open places in jungles, open fields, and resaca bottoms, on banks and arroyo banks, prairies and coastal prairies, and along roadsides, at altitudes of 10 to 20 meters, flowering and fruiting from February to June and in August and October.

It is called "Rio Grande vervain" and was apparently introduced into cultivation in 1901. Suksdorf 2955 was collected at Portland, Oregon, presumably as a waif, on October 26, 1900 --

seeds were taken from it and planted in a garden at Bingen, Washington, and specimens collected there on August 10, 1901. Runyon describes the fruit as "a small capsule", but it is a schizocarp. L. I. Davis, in a letter to me dated March 25, 1942, refers to several color forms of this species which he states that he is thinking of naming and describing. Thus far I know of only one that has actually been published by him.

Material of this species has been misidentified and distributed in herbaria under the names V. halei Small, V. neomexicana (A. Gray) Small, V. neomexicana var. xylopoda Perry, V. officinalis L., V. xutha Lehm., and "Verbena hybrid". Ferris & Duncan 3160 was annotated by Perry as "aff. V. xutha". R. Runyon 2588 is accompanied by a photograph of the plant growing in situ.

In all, 105 herbarium specimens, including type material of all names involved, and 2 mounted photographs and clippings have been examined by me.

Citations: TEXAS: Aransas Co.: Cory 49034 (N). Brazoria Co.: Killip 42107 (W-2069798); Lundell & Lundell 11036 (N, Rf, Rf, W-1926940). Cameron Co.: J. F. Brenckle 47-350 (N); Clover 1519 (M1), 1695 (M1); Cory 28299 (N), 36467 (N, N), 51439 (Sm); Mrs. P. Cottrell 8743 (Au); L. Davis 35 (Au-122639, N); L. I. Davis s.n. [Southmost, May 1942] (Au, Gg-316103, N, Sm, W-1873783); Ferris & Duncan 3160 (Du-125423, Gg-31405, N); H. C. Hanson 496 (W-982847); M. C. Johnston 253-7 (Au-122641); C. L. Lundell 10679 (N, Rf), 10681 (Sm), 10709 (N, Rf, W-1926932); Lundell & Lundell 10012 (Ld, M1, N), 10753 [Plant. Exsicc. Gray. 1274] (Al, Au, Au-197757, B, Bm, Ca-702525, Dp-31803, Du-350208, Gg-308963, Gu-23596, H-84531, Hi-53014, I, Ka-95213, Ld, Ld, M1, M1, M1, Ms, N, N, Or-49870, Pl-131195, Rf, Rf, S, Sm, St-23303, Tl, Ur, Vi, W-1925784, We); A. R. Moldenke 190 (Fg, Z); Rose & Russell 24238 (W-1369527); R. Runyon 2485 (It-isotype, N-type, N-isotype, N-isotype), 2588 (N, N, N, N, N, N, N, N, N, N, N-photo), 2691 (N, N), 2692 (N, N), 3178 [Herb. Texas Agr. Exp. Sta. 43663] (Au), 4187 (Au, N, S); Sixth Grade Brownsville 34 (Au), s. n. [Nov. 1934] (Au); Tharp 1201 (Au, W-1116114). Nueces Co.: F. B. Jones 1925 (Ww), 6191 (Ww); F. W. Pennell 10340 (N). OREGON: Multnomah Co.: Suksdorf 2955 (Pl-138416). MEXICO: Nuevo León: R. F. Smith 476 (Au-218097). CULTIVATED: Washington: Suksdorf s.n. [garden, Bingen, Aug. 10, 1901; from Portland] (Pl-138362). MOUNTED CLIPPINGS: Moldenke, Phytologia 2: 25. 1941 (W).

VERBENA RUNYONI f. ROSIFLORA L. I. Davis in A. M. T. Davis, Study Boscaje Palma 62. 1942; L. I. Davis, Nature Leaflet [Lower Rio Grande Valley Nat. Club] 2: [4]. 1945.

Synonymy: Verbena runyonii f. rosiflora L. I. Davis ex Moldenke, Alph. List Invalid Names 26, in syn. 1947.

Bibliography: A. M. T. Davis, Study Boscaje Palma 62. 1942;

Moldenke, Known Geogr. Distrib. Verbenac. Suppl. 1: 2 & 4. 1943; L. I. Davis, Nature Leaflet [Lower Rio Grande Valley Nat. Club] 2: [4]. 1945; Moldenke, Alph. List Invalid Names Suppl. 1: 26. 1947; Moldenke, Wrightia 1: 226. 1948; Moldenke, Alph. List Cit. 4: 1218. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 24 & 199. 1949; Moldenke, Résumé 30, 373, & 474. 1959.

This form differs from the typical form of the species in having rose-colored corollas.

The type of the form was collected by L. Irby Davis at Southmost, Cameron County, Texas, in May, 1942, and is deposited in the herbarium of the University of Texas at Austin. It is known to me only from the type specimen and 2 mounted photographs.

Citations: TEXAS: Cameron Co.: L. I. Davis s.n. [Southmost, May 1942] (Au---type, N---photo of type, Z---photo of type).

VERBENA RUSSELLII Moldenke, Phytologia 2: 55--56. 1941.

Bibliography: Moldenke, Phytologia 2: 55--56. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19 & 102. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 80. 1948; Moldenke, Phytologia 3: 133. 1949; Moldenke, Alph. List Cit. 3: 873. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 33 & 199. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 14. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Résumé 40 & 474. 1959.

Annual herb, not at all nigrescent in drying; stems slender, sharply tetragonal, very minutely and obscurely puberulent throughout; nodes annulate; principal internodes 2--6.5 cm. long; leaves decussate-opposite, the uppermost ones sessile, the lower and older ones petiolate; petioles to 1 cm. long, winged, hirsute-pubescent; lower leaf-blades elliptic or ovate-elliptic in outline, 1--4 cm. long, 8--15 mm. wide, acute at the apex, irregularly incised-dentate along the margins, long-attenuate into the petiole at the base, rather densely hirsutulous and glandular on both surfaces, especially beneath, with stiff whitish hairs, the margins slightly revolute in age; midrib and secondaries flat or subimpressed above, prominent beneath; upper leaves linear-lanceolate, sessile, 5--15 mm. long, irregularly incised-dentate or entire, densely glandular-hirsutulous on both surfaces, with a very prominent midrib beneath; inflorescence terminal, spicate, paniculately branched, the branches to 20 cm. long, densely many-flowered; peduncles slender, sharply tetragonal, minutely puberulent, often elongate; rachis densely glandular-puberulent; bractlets lanceolate, 2--2.5 mm. long, attenuate to the sharply acute apex, densely glandular-pubescent and ciliate-margined; calyx tubular, about 2 mm. long, densely glandular-puberulent, its rim 5-apiculate; corolla small, hypocrateriform, its tube 3--3.5 mm. long, very slender, the limb 2--3 mm. wide during anthesis.

The type of this species was collected by Joseph Nelson Rose, Paul Carpenter Standley, and Paul George Russell (no. 14850) in a moist field in the vicinity of Culiacan, Sinaloa, Mexico, on April 21, 1910, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is named in honor of Paul

George Russell and the type was annotated by Perry as "aff. V. officinalis L." in 1922. Gentry found the species in heavy clay soil of the coastal plain in Thorn Forest association at an altitude of 100 feet, calls it a "common annual", and records the popular name "alusame". It has been collected in flower and fruit in March and April.

In all, 6 herbarium specimens, including the type, have been examined by me.

Citations: MEXICO: Sinaloa: H. S. Gentry 7011 (Ak--21727, Du--356400, Mi, N); Rose, Standley, & Russell 14850 (N--type). Sonora-Chihuahua: H. S. Gentry 557m (Ak--20007).

xVERBENA RYDBERGII Moldenke, Revist. Sudam. Bot. 4: 19--20. 1937.

Synonymy: Verbena paniculato-stricta Engelm., Am. Journ. Sci. 46: 100. 1844. Verbena stricto-paniculata Engelm., Am. Journ. Sci. 46: 101. 1844. Verbena hastata x stricta Rydb., Bot. Surv. Nebr. 3: 18. 1894. Verbena paniculata x stricta Engelm. apud Rydb., Contrib. U. S. Nat. Herb. 3: 173. 1895. Verbena bracteosa x stricta Rydb., Fl. Rocky Mts. 740. 1917. Verbena hastata x stricta Paternmann, Beitr. Zytol. Verbenac. 43. 1935. Verbena bracteosa x stricta Deam ex Moldenke, Revist. Sudam. Bot. 4: 20, in syn. 1937. Verbena bracteosa x stricta Eggert ex Moldenke, Revist. Sudam. Bot. 4: 20, in syn. 1937. Verbena stricta x hastata Eggert ex Moldenke, Revist. Sudam. Bot. 4: 20, in syn. 1937. Verbena hastata x stricta Gates, Fl. Kans. 190. 1940. Verbena stricta x hastata Hill ex Moldenke, Suppl. List Invalid Names 10, in syn. 1941. Verbena stricta x hastata Schneck ex Moldenke, Suppl. List Invalid Names 10, in syn. 1941. Verbena stricta x urticifolia Stevens (in part) ex Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947. Verbena stricto-hastata Patterson ex Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947. Verbena stricta x hastata Gates (in part) ex Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947. Verbena hastata x stricta Anderson ex Moldenke, Résumé 365, in syn. 1959. Verbena stricta x hastata Patterson ex Moldenke, Résumé 375, in syn. 1959. Verbena stricta x urticifolia Patterson ex Moldenke, Résumé 375, in syn. 1959. Verbena stricta x urticaefolia Eggert ex Moldenke, Résumé 375, in syn. 1959. Verbena stricta x urticifolia Glatfelter ex Moldenke, Résumé 375, in syn. 1959. Verbena urticaefolia x stricta Engelm. ex Moldenke, Résumé Suppl. 3: 41, in syn. 1962. Verbena rydbergi Moldenke, Résumé Suppl. 4: 18, in syn. 1962.

Bibliography: Engelm., Am. Journ. Sci. 46: 100--101. 1844; Rydb., Bot. Surv. Nebr. 3: 18. 1894; Rydb., Contrib. U. S. Nat. Herb. 3: 173. 1895; Rydb., Fl. Rocky Mts. 740. 1917; Kanda, Bot. Gaz. 69: 54--71, fig. 62, 73, & 74, pl. 6, fig. 4--6. 1920;

Schwenke, Zytol. Untersuch. Verbenac. 43. 1931; Rydb., Fl. Cent. N. Am. 678. 1932; Patermann, Beitr. Zytol. Verbenac. 19 & 43. 1935; Moldenke, Revist. Sudam. Bot. 4: 19--20. 1937; Gates, Fl. Kans. 190. 1940; Moldenke, Prelim. Alph. List Invalid Names 45--48. 1940; Moldenke, Suppl. List Invalid Names 10. 1941; Moldenke, Alph. List Invalid Names 45, 47, 49, & 50. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 6--9, 11, & 102. 1942; Deam, Kriebel, Yuncker, & Friesner, Proc. Ind. Acad. Sci. 54: 95. 1945; Moldenke, Castanea 10: 38. 1945; Moldenke, Bot. Gaz. 106: 159. 1945; Moldenke, Alph. List Cit. 1: 9, 109, 110, 121, 143, 149, 181, 193, 236, 256, & 267. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 24 & 27. 1947; Hill & Salisb., Ind. Kew. Suppl. 10: 242. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 80. 1948; Deam, Yuncker, & Friesner, Proc. Ind. Acad. Sci. 58: 95. 1948; Moldenke, Alph. List Cit. 2: 394--398, 400, 401, 438, 451, 452, 477, 513, 516, 517, 520, 524, 538, 547, 588, 594, 596, 605, 615, 620, & 644 (1948), 3: 774, 790--793, 800, 881, 887, 892, 900, 904, & 970 (1949), and 4: 996, 998, 1217, 1226, 1236, 1238, 1255, & 1261. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 12--15, 17, 18, 20, 21, & 199. 1949; Moldenke, Phytologia 3: 72 & 131 (1949), 3: 284 (1950), and 4: 67. 1952; Moldenke in Gleason, New Britton & Br. Illustr. Fl., print. 1, 3: 126, 129, & 132. 1952; Moldenke, Phytologia 4: 185. 1953; Moldenke in Gleason, New Britton & Br. Illustr. Fl., print. 2, 3: 126, 129, & 132. 1958; Moldenke, Am. Midl. Nat. 59: 359--361. 1958; Moldenke, Résumé 16--19, 21, 22, 25, 26, 359, 365, 366, 371, 375, & 474. 1959; Moldenke, Résumé Suppl. 2: 1 & 2. 1960; Moldenke, Phytologia 8: 121 & 146. 1961; Moldenke, Résumé Suppl. 3: 4--6 & 41 (1962), 4: 3, 18, & 21 (1962), and 5: 3. 1962; J. D. Poindexter, Trans. Kans. Acad. Sci. 65: 410, 411, 413, 415, & 417. 1962; Moldenke, Résumé Suppl. 7: 2. 1963; Gleason & Cronquist, Man. Vasc. Pl. 580. 1963; Steyer., Fl. Mo. 1258 & 1260, map 1842. 1963; Moldenke, Phytologia 9: 53, 54, 206, 215, & 219--221 (1963), 9: 356 & 359 (1964), and 10: 109, 154, & 155. 1964; Moldenke, Résumé Suppl. 10: 1 (1964) and 11: 1, 2, & 8. 1964.

Illustrations: Kanda, Bot. Gaz. 69: 66, fig. 62, 67, fig. 73 & 74, & pl. 6, fig. 4--6. 1920; Moldenke in Gleason, New Britton & Br. Illustr. Fl., print. 1, 3: 132 (1952) and print. 2, 3: 132. 1958.

This is the natural hybrid between V. hastata L. and V. stricta Vent. which occurs commonly where the ranges of these two species overlap in the central United States and southern Canada. It resembles V. hastata in habit, but its leaves are more reticulate-venose, densely velutinous beneath, the corolla is larger, the bractlets are ovate-lanceolate, about 4 mm. long, and not carinate, and the calyx is 4--5 mm. long. Fruit is produced sparingly. The corolla is said to vary from blue, lilac-blue, or purplish-blue to verbena blue, bright bluish-purple, heliotrope, or pink. The chromosome number is $n = 7$, based on Poindexter 191-29, 191-91, and 201-57, which are all typical of the hybrid and on which the pollen fertility was 21, 12, and 30 percent respectively. His 191-1 show

ed 33 percent pollen fertility. Schwenke (1931) reports the haploid chromosome number for this hybrid as 6.

Poindexter (1962) compares this hybrid with its two parents as follows: Leaf index: V. stricta = 1.3—2.1 (average 1.8), xV. rydbergii = 1.7—3.5 (average 2.6), V. hastata = 3.2—5 (average 4.3); leaf-shape: V. stricta = elliptic to ovate, xV. rydbergii = broadly ovate to lanceolate, V. hastata = lanceolate; leaf-base: V. stricta = broadly attenuate to sessile, xV. rydbergii = broad to narrow attenuate, some hastately lobed, V. hastata = rounded & petiolate, hastately lobed; leaf-apex: V. stricta = acute to rounded, xV. rydbergii = gradually to abruptly acuminate, V. hastata = gradually acuminate; stem pubescence: V. stricta = hirsute, xV. rydbergii = long-strigose to hirsute, V. hastata = strigose; nutlet length: V. stricta = 2.2—2.9 (average 2.6), xV. rydbergii = 1.5—3 (average 2.5), V. hastata = 1.5—2 (average 1.7); markings on back of nutlets: V. stricta = deeply ribbed, xV. rydbergii = deeply ribbed to faintly ribbed or striate, V. hastata = smooth to faintly striate; pollen fertility: V. stricta = 50—100 percent (average 90 percent), xV. rydbergii = 3—92 percent (average 32.7 percent), V. hastata = 30—99 percent (average 79.8 percent); corolla-tube length: V. stricta = 4.5—5.5 (average 4.9), xV. rydbergii = 2.5—5.2 (average 4), V. hastata = 2—3.9 (average 3.5); calyx length: V. stricta = 3.8—5.1 (average 4.3), xV. rydbergii = 2.4—4.3 (average 3.2), V. hastata = 2.4—3 (average 2.7); petiole-lateral vein measurement: V. stricta = 3—6 (average 3.8), xV. rydbergii = 5—22 (average 9.7), V. hastata = 12—25 (average 17.6). His 229-8 showed 73.4 percent pollen fertility — some spikes are typical V. stricta, heavily fruited, but some are the typical hybrid with hardly any fruit, on the same stem; the lower leaves are hastate. His 229-19 had 88 percent pollen fertility and its inflorescence is almost typical V. stricta, but the leaves are hastate. G. E. Morley 805 and 1054-2 are the typical hybrid in all respects.

This hybrid has been found in waste or weedy ground, wet ground in streambeds, low marshy or wet land, low places in sand dunes, moist or sandy soil, sandy loam, broad ravines below ponds, moist ravines in limestone areas, waste places, sandy fields, pastures and overgrazed pastures, brushy overgrazed pastures, open woods, creek bottoms, and dry ponds, along roadsides or low grassy roadsides, creeks, and sloughs, at the junction of dry and moist bottoms, near low pasture draws, and on badly eroded or gravel hillsides, dry open or sand ridges, sandy slopes, and prairies, flowering from June to September, fruiting from July to September, to 740 feet altitude. Shimek encountered it on sandy slopes above skunk-cabbage (Symplocarpus foetidus) bogs; Ahles & Gilpin found it "frequent with both parents" in pastures; Ahles found it "in marshy area around pond, with V. hastata, V. stricta,

and V. urticifolia"; Goodman collected it growing with V. stricta and V. halei Small; Isely found it "scattered in pastures", while Lathrop saw it on "roadside bank bordering a prairie pasture with limestone surfacing in the pasture" and in a "waste place bordering a prairie park area, weedy ground." Wagenknecht found it on a weedy rocky southfacing bluestem prairie hillside, McGregor "scattered between parents in low moist areas in pasture" and "in ravine in prairie", while Horr found it "common in local colonies in wet alluvium of floodplain" in Kansas.

Miss Gaiser reports that "this form [her no. 1608PE] is quite abundant about this region and stretches over quite an area at Point Edward [Ontario] where the river front road passes [the] dump back of Metal Works, in sandy soil". For her 2232PE she reports "one plant with 10 tall stems, leaves near those of V. hastata; flowers heliotrope, pale in contrast to others", while for 1764PE she says "with narrower less rounded and more deeply cut leaves than 1759PE, flowers purplish-blue, on sandy ridge." Morley and McGregor describe its occurrence as "scattered".

E. W. Fell 57-736 is a mixture with V. hastata, while Demaree 29151 and L. H. Pammel s.n. [Hamilton, Sept. 8, 1918] & s.n. [Granite, Sept. 1, 1920] are mixtures with V. stricta — indicating, again, the close proximity of at least one of the parent species.

The type of the hybrid, which is based on the V. paniculato-stricta of Engelmann, was collected by George Engelmann on the banks of the Mississippi River at Saint Louis, Missouri, in July, 1843, and is deposited in the Torrey Herbarium at the New York Botanical Garden. Verbena bracteosa x stricta Deam is based on a plant collected by Charles Clemon Deam (no. 20603) in Washington County, Indiana, and deposited in the herbarium of Purdue University; V. hastata x stricta Anderson is based on a collection made by Jacob Peter Anderson in Decatur County, Iowa, on August 25, 1904, and is deposited in the herbarium of Iowa State College; V. stricta x hastata Eggert is based on a collection made by Heinrich Karl Daniel Eggert in Saint Louis County, Missouri, on August 10, 1877, and is deposited in the herbarium of the Carnegie Museum; V. stricta x hastata Hill is based on a collection made by Ellsworth Jerome Hill (no. 160/1898) in waste ground at Eggleston, Chicago, Cook County, Illinois, on August 10, 1898, and is deposited in the herbarium of the University of Illinois; V. stricta x hastata Patterson and V. stricta x urticifolia Patterson are both based on a collection made by Harry Norton Patterson in the vicinity of Oquawka, Henderson County, Illinois, in "July", and is deposited in the herbarium of Iowa State College; V. stricta x hastata Schneck is based on a collection made by Jacob Schneck in moist soil beyond the Utter farm, Mount Carmel, Wabash County, Illinois, in June, 1908, and is deposited in the herbarium of the University of Illinois; V. stricta x urticaefolia Eg-

gert is based on an Eggert collection from Saint Louis, Missouri, made in August, 1875, and deposited in the herbarium of Iowa State College; V. stricta x urticifolia Glatfelter is based on a collection made by Noah Miller Glatfelter near Saint Louis, Missouri, on August 11, 1894, and is deposited in the herbarium of the University of Michigan; V. stricta x urticifolia Stevens (in part) is based on a collection made by George Walter Stevens (no. 2308, in part) in open woods near Miami, Ottawa County, Oklahoma, on May 26, 1913, and is deposited in the herbarium of the University of Oklahoma; V. stricto-hastata Patterson is based on a collection made by Patterson near Oquawka, Henderson County, Illinois, in August, 1873, and deposited in the United States National Herbarium; V. stricto-paniculata Engelmann is based on a collection made by Engelmann at Saint Louis, Missouri, in July, 1842, and is deposited in the Torrey Herbarium; and V. urticaefolia x stricta Engelm. is based on a collection made by Engelmann on the Ridge prairie, Vermilion County, Illinois, in August, 1860, and deposited in the Jesup Herbarium of Dartmouth College.

It is worth noting here that the V. bracteosa x stricta of Britton, of Clothier, of Palmer, and of Schnack are xV. perriana Moldenke; V. hastata x stricta of Allen is V. stricta f. albiflora Wadmond, of Elmore is V. hastata L., and of Ravenel is Stylo-don carneus (Medic.) Moldenke; V. stricta x hastata of Allen is V. stricta Vent. and of Gates (in part) is V. stricta Vent. and xV. moechina Moldenke; V. stricta x urticaefolia of Gates, of Mackenzie, and of Pond are xV. illicita Moldenke, of Letterman and of Pammel are xV. moechina Moldenke; and V. stricta x urticifolia of Britton, of Bush, of Eggert, of Gates, and of Schneck are xV. illicita Moldenke, and of Stevens (in part) is xV. illicita and xV. perriana.

Numerous collectors have noted the possible hybrid nature of specimens and have commented on it. For instance, Hayden 3006 is labeled "Verbena hastata L. x V. stricta Vent.", while L. H. Pammel s.n. [Trempealeau, 7-20-82] bears the notation "a possible hybrid between V. hastata and V. stricta."

Material of this hybrid has been misidentified and distributed in herbaria under the names V. hastata L., V. hastata Michx., V. hastata stricta Rydb., V. hastata x urticifolia Eggert, xV. illicita Moldenke, V. officinalis L., V. stricta Vent., V. stricto-urticaefolia Engelm., and V. urticifolio-paniculata Engelm. On the other hand, the W. H. Horr E.33, distributed as "Verbena hastata x stricta", is actually typical V. stricta Vent., while the A. E. Allen s.n. [Talmage, July 11, 1891] and J. L. Sheldon s.n. [Peru, July 21, 1900], identified as "V. stricta x hastata", and the E. W. Lathrop 963, distributed as xV. rydbergii, are also typical V. stricta, and the S. V. Fraser 440, Loomis s.n. [Alton,

Oct. 1938], and Muck 82, cited in Gates, Fl. Kans., as "V. stricta x hastata", are also typical V. stricta. A. E. Allen s.n. [Peru, Aug. 2, 1893], distributed as "V. hastata x stricta", is actually V. stricta f. albiflora Wadmond.

The cytology of this hybrid is discussed by Kanda (1920), who reports that Dr. Chamberlain is authority for the statement that Hugo de Vries looked at specimens of this plant and stated definitely that they were not mutants, but were hybrids. He further states that albino forms occur, but I have seen albinos only of each parent, not as yet of the hybrid.

Gates (1940) records the hybrid from Cloud, Osborne, and Shawnee Counties, but I have not as yet seen material from those counties. He cites Clothier & Whitford s.n. [Elk Co., Aug. 20 & 21, 1897] and Kellerman s.n. [Galena, July 8, 1887] as V. stricta x hastata; Harman 40 as V. hastata x stricta; and J. B. S. Norton s.n. [Webber, Sept. 23, 1895] as V. hastata. xVerbena rydbergii has been recorded from Banner County, Nebraska, on the basis of a sheet of Rydberg 1564 in the Britton Herbarium which has a printed label reading "Banner County", but the longhand inscription says "near Mullen" (as on the other sheets of this number), which is in Hooker County. Apparently an incorrect printed label was used for this particular specimen.

In all, 193 herbarium specimens, including the type material of all the names involved, have been examined by me.

Citations: ONTARIO: Lambton Co.: Gaiser 1608PE (Gp, Gp, Mm), 1764PE (Gp, Gp, Gp, Mm); Gaiser & Montgomery 2232PE (Gp, Gp, Gp, Mm), 3233PE (Gp, Gp, Gp, Mm). ILLINOIS: Bureau Co.: Ahles 4176 (Ur); Winterringer 8008 (Il--37299). Champaign Co.: Ahles & Gilpin 8153 (Ur), 8154 (Hl--103235, Ur); G. N. Jones 12525 (Ur). Cook Co.: E. J. Hill 160/1898 (Ur, Ur, Ur); L. N. Johnson s.n. [Evanston, 9-3-89] (Ur--17462). DeKalb Co.: P. B. Whitford 156 (Il--33924). Fulton Co.: Winterringer 8864 (Il--38680). Hancock Co.: L. H. Pammel s.n. [Hamilton, Sept. 8, 1918] (Io--94058). Henderson Co.: H. N. Patterson s.n. [August 1872] (Al), s.n. [near Oquawka, August 1873] (W--1323127), s.n. [Oquawka, July] (Io--92216, Io--92217), s.n. [vicinity of Oquawka] (W--1323126, W--1323128, W--1323129, W--1416723). LaSalle Co.: Thone 87 (Ur). Macon Co.: A. R. Moldenke 819 (Lw, Ut, Z, Z, Z, Z, Z, Z). Peoria Co.: V. H. Chase 4586 (Ur). Pike Co.: J. Davis 3241 (Ur), s.n. [July 18, 1914] (Se--14934). Sangamon Co.: G. D. Fuller 6406 (Il--15794); J. C. McGregor 11174 (Il--15903). Vermilion Co.: Engelmann s.n. [Ridge prairie, Aug. 1860] (Dt); Storm s.n. [July 28, 1949] (Ur, Ur). Wabash Co.: Schneck s.n. [Mt. Carmel, Sep. 1, 1887] (Ur), s.n. [Mt. Carmel, June 1900] (Ur). Winnebago Co.: E. W. Fell 51324 (Il--38586), 51328 (Il--38587), 51329 (Il--38609), 51404 (Il--38332). County undetermined: F. Brendel s.n. [Illinois, 1873] (W--71993). INDIANA: Pulaski Co.: Friesner 22372

(N). Washington Co.: C. C. Deam 20603 (N, N, Pu). County undetermined: Drew s.n. [northwestern Indiana] (Ca--67759). IOWA: Adams Co.: Isely 5706 (Gg--392102). Cherokee Co.: L. H. Pammel s.n. [Cherokee, Oct. 17, '24] (Io--114907); Pammel & MacDonald s.n. [Goodell, July 12, 1922] (Io--105746). Clay Co.: A. Hayden 3003 (Io--149004), 3005 (Ca--999282, W--1835171), 3006 (Ca--999283, Io--149007, N, W--1835172). Dallas Co.: L. H. Pammel s.n. [Dawson, Aug. 16, 1918] (Io--95629). Decatur Co.: J. P. Anderson s.n. [Aug. 25, 1904] (Io--52107). Dickinson Co.: Shimek s.n. [Aug. 8, 1916] (N, Ur). Hancock Co.: L. H. Pammel s.n. [Garner, Jul. 27, 1918] (Io--96114). Hardin Co.: L. H. Pammel s.n. [Steamboat Rocks, 9-12-12] (Io--52669, Io--52670), s.n. [Eldora, Oct. 5, 1924] (Io--116221). Lyon Co.: L. H. Pammel s.n. [Granite, Sept. 1, 1920] (Io--97830). Madison Co.: A. R. Moldenke 942 (Lw, Ut, Z). Mahaska Co.: A. R. Moldenke 960 (Lw). Muscatine Co.: Shimek s.n. [Aug. 21, 1915] (N, Ur); Somes 3704 (W--672400). Palo Alto Co.: L. H. Pammel s.n. [Jul. 18, 1920] (Io--97793). Poweshiek Co.: Conard s.n. [8-29-1927] (Ok--10362); M. E. Jones s.n. [Grinnell, Aug. 1877] (Du--176622); A. R. Moldenke 966 (Lw). Story Co.: L. H. Pammel s.n. [Ames, 1902] (Io--81968). Warren Co.: A. R. Moldenke 951 (Lw). Winneshiek Co.: Tolstead s.n. [Decorah, July 23, 1934] (Io--144284). WISCONSIN: Grant Co.: A. R. Moldenke 997 (Lw); L. H. Pammel s.n. [Muscoda, Aug. 1928] (Io--137887). Rock Co.: E. W. Fell 57-736, in part (Ws), 57-740 (Ws); Skavlem s.n. [Janesville, July 23, '89] (Ws). Trempealeau Co.: Fassett & Wilson 9776 (Ws); L. H. Pammel s.n. [Trempealeau, 7-20-82] (Io--108154). MINNESOTA: Hennepin Co.: Sandberg 605 (Ka). KANSAS: Allen Co.: R. L. McGregor 13230 (Lw). Atchison Co.: A. S. Hitchcock s.n. [Atchison Co., Oct. 1896] (Ka). Barber Co.: Horr & Franklin s.n. [July 6, 1940] (Lw); R. L. McGregor 14598 (Lw); J. D. Poindexter 201-57 (Lw). Brown Co.: Clothier & Whitford s.n. [July 29, 1897] (Ka). Chautauqua Co.: W. H. Horr s.n. [July 6, 1930] (Lw). Cherokee Co.: Kellerman s.n. [Galena, July 8, 1887] (Ka). Cheyenne Co.: W. H. Horr 4691 (Lw). Comanche Co.: R. L. McGregor 14678 (Lw). Douglas Co.: J. D. Poindexter 191-1 (Lw), 191-29 (Lw), 191-91 (Lw), 229-8 (Lw), 229-19 (Lw). Elk Co.: Clothier & Whitford s.n. [Elk Co., Aug. 20 & 21, 1897] (Ka). Ellis Co.: E. Runyon 280 (Dm). Jackson Co.: B. L. Wagenknecht 3788 (Lw). Jefferson Co.: Harman 40 (Ka). Jewell Co.: J. B. S. Norton s.n. [Webber, Sept. 23, 1895] (Ka). Leavenworth Co.: W. H. Horr s.n. [6/14/30] (Lw). Marshall Co.: A. S. Hitchcock s.n. [Marshall Co., Dec. 10, 1896] (Ka). Montgomery Co.: R. L. McGregor 14395 (Lw). Nemaha Co.: A. S. Hitchcock s.n. [Nemaha Co., Dec. 11, 1896] (Ka). Pottawatomie Co.: Clothier s.n. [St. George, Aug. 28, 1896]

(Ka). Reno Co.: R. L. McGregor 12511 (Lw). Republic Co.: G. E. Morley 805 (Lw), 830 (Lw), 1054-2 (Lw). Scott Co.: V. L. Harms 1108 (Lw). Woodson Co.: E. W. Lathrop 963 (W--2235188), 1376 (N). County undetermined: Kleeberger s.n. (Gg--31419). MISSOURI: Holt Co.: Spellman S.311 (Lb--51524). Saint Louis Co.: Eggert s.n. [19 Aug. 1877] (Cm, I); Glatfelter s.n. [near St. Louis, 8-11-94] (Mi). Saint Louis: Eggert 5320 (N), s.n. [St. Louis, 4 Aug. 1875] (C, Go, Po--192591), s.n. [St. Louis, Aug. 1875] (Au, B, Ba, Ca--181598, Ca--425201, Cm, Du--202132, Gg--183217, Io--79869, Mn--6892, N, Po--192592, W--754955), s.n. [12 Aug. 1877] (Al); Engelmann s.n. [July 1939] (Br), s.n. [St. Louis, July 1842] (Pr, T), s.n. [banks of Mississippi, St. Louis, July 1843] (T--type), s.n. [St. Louis, Aug. 17, 1859] (Dt), s.n. [St. Louis] (S); Glatfelter s.n. [St. Louis, 6-3-92] (W--309643); Lejeune s.n. (Br). ARKANSAS: Benton Co.: Heacox s.n. [July 20, '89] (Ob--50804). Marion Co.: Demaree 29151, in part (Au--122726). NEBRASKA: Cedar Co.: F. E. Clements 2663 1/2 (C, W--71943). Hooker Co.: Rydberg 1564 (N, N, W--210369). Lancaster Co.: J. L. Sheldon s.n. [Lincoln, July 20, 1898] (We). Thomas Co.: Krautter s.n. [Halsey, July 23, 1907] (Up--45740, Up--45741, Up--45746, Up--45748). OKLAHOMA: G. W. Stevens 1791 (Ur, W--589685). Marshall Co.: G. J. Goodman 6488 (Ok, Z). Ottawa Co.: Schendel 202 (St--17571); G. W. Stevens 2308, in part (Du--66376, N, Ok--21028), A.2308 (St--9278). County undetermined: G. W. Stevens 4032a (Ok). LOCALITY OF COLLECTION UNDETERMINED: Engelmann s.n. (Dt); Short s.n. [banks of the Wabash] (Pr).

VERBENA SAGITTALIS Cham., Linnaea 7: 259. 1832.

Bibliography: Cham., Linnaea 7: 259. 1832; Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 603. 1843; Walp., Repert. 4: 18. 1845; Schau. in A. DC., Prodr. 11: 543. 1847; Schau. in Mart., Fl. Bras. 9: 190. 1851; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 147. 1894; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; Briq., Arkiv Bot. Stockh. 2 (10): 13--14. 1904; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39 & 102 (1942) and [ed. 2], 94 & 199. 1949; Moldenke, Phytologia 3: 454. 1951; Moldenke, Résumé 111 & 474. 1959; Moldenke, Résumé Suppl. 3: 41. 1962; Moldenke, Phytologia 9: 114. 1963.

Perennial herb, with creeping rootstocks; stems simple, 45--60 cm. tall, rush-like, tetragonal, with an aphyllous aspect, contracted at the nodes, the angles subulate, the margined edges and surfaces scabrous, the surfaces canaliculate, scrobiculate in lines, the depressions suborbicular, puberulent; internodes long-striate, marked with small pits or depressions between the striations; leaves small, sessile, less than 2.5 cm. long, ovate or triangular-oblong, acute at the apex, entire or subserrate along the margins, 3-nerved, strigose-scabrous; spikes cylindric, dense-flowered, subternately aggregate, becoming almost 2.5 cm.

long, thick; bractlets lanceolate, short, half as long as the calyx, acuminate at the apex, the margins hirtulous; calyx 5 mm. long, with elevated ridges, the angles hirtulous, the teeth subulate; corolla-tube scarcely longer than the calyx, the limb small; cocci about 2 mm. long, ferruginous on the back, slightly veiny and not striate-sulcate, margined, the commissure honey-colored, very slightly strigillose, leathery around the edges.

The type of this little-known species was collected by Friedrich Sellow in "Brasilia meridionali" and was deposited in the herbarium of the Botanisches Museum in Berlin, now destroyed. Unfortunately, it was never photographed, as far as I am aware, but was at one time studied by Dr. Briquet, who has given a brief description of it and vouches for the characters enumerated by Chamisso and by Schauer. Briquet (1904) compares it with and clearly differentiates it from V. ephedroides Cham., V. lindmanii Briq., and Junellia pseudo-junceae (C. Gay) Moldenke. Schauer (1851) points out that V. sagittalis is closely related to V. alata Sweet, but differs in its inflorescence, its bigger spikes and calyxes, in the character of the fruit, and most especially in the scrobiculate stems. Walpers (1845) classifies it in his Section Verbenaca, Subsection Inermes, and Group Junceae, with 7 other species. It has been collected in anthesis in March. Only 2 herbarium specimens have been examined by me.

Citations: BRAZIL: Rio Grande do Sul: Schwacke III.299 (Ja, N).

VERBENA SANTIAGUENSIS (Covas & Schnack) Moldenke, Phytologia 2: 150. 1946.

Synonymy: Glandularia santiaguensis Covas & Schnack, Revist.

Argent. Agron. 11: 92--94, fig. 2. 1944. Verbena santiaguensis

Brücher ex Moldenke, Résumé Suppl. 7: 10, in syn. 1963.

Bibliography: Covas & Schnack, Revist. Argent. Agron. 11: 92--94 & 97, fig. 2. 1944; Covas & Schnack, Darwiniana 7: 86 & 88. 1945; Schnack & Covas, Darwiniana 7: 71, 73--75, & 77--79, fig. 2 & 5. 1945; Schnack & Covas, Revist. Argent. Agron. 12: 222, 224, & 228. 1945; Schnack & Gonzalez, Revist. Argent. Agron. 12: 285--288, fig. 1 & 2, pl. 15. 1945; Moldenke, Phytologia 2: 150 (1946) and 2: 348. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 10. 1947; Moldenke, Alph. List Cit. 3: 672 & 744. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 100, 107, 164, & 199. 1949; Moldenke, Revist. Sudam. Bot. 8: 169. 1950; Moldenke, Phytologia 3: 454 & 468. 1951; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209 & 2212. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 101 & 263. 1953; Moldenke, Phytologia 5: 133. 1955; Moldenke, Biol. Abstr. 30: 1093. 1956; Crovetto & Rojo, Revist. Invest. Agric. 11 (2): 129. 1957; Moldenke, Am. Midl. Nat. 59: 345, 356, 362, & 363. 1958; Moldenke, Résumé 120, 128, 224, 296, 420, 421, & 474. 1959; Moldenke, Résumé Suppl. 2: 13. 1960; Moldenke, Phytologia 8: 120, 121, & 123 (1961) and 8: 378 & 419. 1962; Moldenke, Résumé Suppl. 4: 18 (1962) and 7: 6 & 10. 1963; Moldenke, Phytologia 9: 45, 46, 131, & 199 (1963), 9: 400 (1964), 10: 133, 186, 295, & 301 (1964), and 11: 52. 1964.

Illustrations: Covas & Schnack, *Revist. Argent. Agron.* 11: 93, fig. 2. 1944; Schnack & Covas, *Darwiniana* 7: 78, fig 2A, pl. 1A & 5B. 1945; Schnack & Gonzalez, *Revist. Argent. Agron.* 12: 286, fig. 1A, D, E, & F, 287, fig. 2 A—E, & pl. 15, A. B. & D. 1945.

Perennial herb, sometimes erect; stems usually creeping, rooting at the lower nodes, ascending toward the apex, cylindric-quadangular, pubescent, the hairs simple, rather rigid, 0.5 mm. long, oblique, retrorse; leaves decussate-opposite; petioles long, 0.5--1.7 cm. long; leaf-blades pinnatisect, ovate-triangular in outline, 2--5.5 cm. long, 1.3--3.5 cm. wide, pubescent above with simple subappressed hairs, pubescent on the margins and venation beneath with simple oblique hairs, the lobules acute to subobtuse at the apex, subrevolute along the margins; inflorescence terminal, spicate, solitary, abbreviated during anthesis but sometimes elongating after anthesis; bractlets lanceolate, more than half the length of the calyx, ciliate along the margins, with subappressed hairs on the back; calyx tubular, 6--7 mm. long, pubescent with simple oblique hairs, rarely with sessile glands on the angles; corolla hypocrateriform, pale-lilac or purple, laxly pubescent at the apex of the tube outside as well as on the lower surface of the upper lobes and at the base of the lower lobes, the lobes all glabrous on the upper surface; stamens typical, the 2 upper ones with subcylindric glandular appendages, the thecae large and exserted; pistil typical; style 6.5 mm. long; ovary 1 mm. long; cocci subcylindric, 2 mm. long, rounded at the apex, truncate at the base, reticulate at the middle on the upper surface of the back; chromosome number: $2n = 10$.

The species is based on a specimen collected by Benno Julio Christian Schnack (no. 2111) from material cultivated at Capital, Mendoza, Argentina, on April 1, 1944, grown from seed originally collected from plants growing along the highway between Santiago del Estero and Catamarca, in the province of Santiago del Estero, Argentina. Covas & Schnack (1944) note that "El polen de esta especie presenta un grado relativamente elevado de esterilidad (alrededor del 50% de polen es estéril), según las observaciones efectuadas en el ejemplar tipo." They assert that its relationships are with *V. dissecta* Willd. and *V. laciniata* (L.) Briq. They distinguish it from its immediate relatives as follows:

1. Stems erect or suberect, not rooting.
2. Entire plant covered with a dense pubescence of simple hairs mixed with glandular ones; leaves triparted-pinnatilobed.....*V. perakii*.
- 2a. Entire plant covered with a sparse pubescence of only simple hairs; leaves pinnatisect.....*V. mendocina*.
- 1a. Stems creeping, rooting at the base, ascending at the tips.
3. Cocci 2 mm. long.
4. Bractlets one-third as long as the calyx; spikes not elongating after anthesis.....*V. dissecta*.
- 4a. Bractlets more than half the length of the calyx; spikes elongating after anthesis.....*V. santiaguensis*.
- 3a. Cocci more than 3 mm. long.

5. Corolla externally glabrous; glandular appendages of the connectives subcylindric, hardly visible from outside or included; pubescence formed of appressed hairs.....V. laciniata.

- 5a. Corolla externally pubescent; glandular appendages of the connectives much compressed, exerted; pubescence formed of erect oblique hairs.....V. parodii.

Crovetto & Rojo (1957) describe the plant as "Planta perenne con tallos rastreros, radicales, vellosos; hojas opuestas, pinatisectas, pilosas; flores pequeñas, blanco-lilacinas, reunidas en espigas primero globosas y luego alargadas. Especie autóctona de floración primaveral y estival; que hemos tenido ocasión de observar invadiendo algunos almácigos y cultivos realizados sobre suelos húmidos y fértiles. También hemos visto un cultivo de cebolla en Chicoana [Salta] totalmente invadido por esta especie." Covas & Schnack (1945) give figures relative to the length of the pistil as compared to the size of the pollen-grains in this species. The only common name recorded for it is "verbena". It has been collected in anthesis in April, July, August, and December. Material has been misidentified and distributed in herbaria under the name V. erinoides L. On the other hand, the Brucher & Brucher s.n. [Rio Pisaril, 30/1/49], distributed as this, is in part V. cheitmaniana Moldenke and in part V. tenera Spreng.

Verbena santiaguensis was introduced into cultivation in 1943. It is very similar to V. tenuisecta Briq., but differs in having its leaf-segments broader, oblong, not uniform in width, mostly 1 mm. or more wide, the corolla-tube less than 1 cm. long, its limb only about 3 mm. wide, and the spikes being densely congested and not elongating even after anthesis according to my observation (this differs from the original description).

In regard to the Lorentz collection cited below from "Concepción", Herter says that "Concepción del Uruguay" is in Argentina, although most of the plants found there occur also in Uruguay.

In all, 5 herbarium specimens have been examined by me.

Citations: URUGUAY: Lorentz s.n. [Concepción, 7.1877] (S).

ARGENTINA: Corrientes: A. T. Hunziker 5528 (N). La Rioja: F. A. Barkley 19Ar694 (N). CULTIVATED: New York: H. N. Moldenke 18604 (N, N).

VERBENA SCABRA Vahl, Eclog. Am. 2: 2. 1798 [not V. scabra Marnock, 1840, nor Muhl., 1825].

Synonymy: Verbena polystachia H.B.K. ex Moldenke, Suppl. List Invalid Names 10, in syn. 1941. Verbena urticifolia Jepson, Fl. Calif. 3 (2): 380, in syn. 1943 [not V. urticifolia L., 1753, nor Gray & Small, 1962]. Verbena polystachya Jepson, Fl. Calif. 3 (2): 380, in syn. 1943 [not V. polystachya H.B.K., 1818]. Verbena polystachys H.B.K. ex Moldenke, Alph. List Invalid Names Suppl. 1: 26, in syn. 1947. Verbena urticaefolia Griseb. ex Alain in León & Alain, Fl. Cuba 4: 281, in syn. 1957 [not V. urticaefolia L.,

- 1811]. Ocimum nervosum Vahl ex Moldenke, Résumé 322, in syn.
 1959. Verbena scabra Gray ex Moldenke, Résumé 374, in syn. 1959.
Verbena urticifolia Griseb. ex Moldenke, Résumé 377, in syn.
 1959. Verbena scabra Vahl ex Moldenke, Résumé Suppl. 7: 7, in syn. 1963.

Bibliography: Vahl, Eclog. Am. 2: 2. 1798; Steud., Nom. Bot., ed. 1, 874. 1821; Spreng. in L., Syst. Veg., ed. 16, 2: 749. 1825; Sweet, Hort. Brit., ed. 2, 418. 1830; Marnock, Floricult. Mag. 5: pl. 54. 1840; Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 604. 1843; Walp., Repert. 4: 21--22. 1845; Schau. in A. DC., Prodr. 11: 546. 1847; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; H. H. Rusby, Mem. Torrey Bot. Club 6: 106. 1896; J. K. Small, Fl. Southeast. U. S., ed. 1, 1009 (1903) and ed. 2, 1009. 1913; N. L. Britton, Fl. Bermuda 310. 1918; Britton & P. Wils., Scient. Surv. Porto Rico 6: 138. 1925; Moldenke, List Spec. Mold. Southeast. Set 10. 1930; Stapf, Ind. Lond. 6: 431. 1931; Perry, Ann. Mo. Bot. Gard. 20: 244, 245, 247, 259, 270, 272--275, 278, & 356. 1933; J. K. Small, Man. Southeast. Fl. 1137. 1933; L. H. Bailey, Cat. Florists Handl. Verbenac. mss. 1935; Fernald, Rhodora 38: 442--443. 1936; Cory, Texas Agr. Exp. Sta. Bull. 550: 89. 1937; Moldenke, Annot. & Classif. List 108. 1939; Fernald, Rhodora 39: 365 & 445 (1939) and 42: 371 & 478. 1940; Moldenke, Suppl. List Common Names 18. 1940; Moldenke, Suppl. List Invalid Names 10. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 3--6, 10, 13, 15, 19, 24--27, & 102. 1942; Moldenke, Alph. List Invalid Names 49. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 16 & 23--24. 1942; Jepson, Fl. Calif. 3 (2): 380. 1943; Moldenke, Known Geogr. Distrib. Verbenac. Suppl. 1: 2. 1943; Moldenke, Bot. Gaz. 106: 160. 1945; Merrill, Guide Fla. Pl. 46. 1945; Moldenke, Phytologia 2: 117. 1945; Moldenke, Am. Midl. Nat. 32: 576. 1945; Moldenke, Castanea 10: 37. 1945; W. H. Hodge, Journ. N. Y. Bot. Gard. 47: 138. 1946; Moldenke, Alph. List Cit. 1: 6, 13, 25, 38, 47, 51, 61, 63, 65, 66, 72, 114, 115, 120, 125, 127, 140, 152, 154, 166, 176, 181, 190, 199, 203, 209, 211, 245, 246, 259, 260, 281, 286, 291, 292, 294, & 296. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 26 & 27. 1947; Fernald, Rhodora 49: 90. 1947; Moldenke, Phytologia 2: 328. 1947; Moldenke, Castanea 13: 111, 112, & 114. 1948; Moldenke, Wrightia 1: 224. 1948; Moldenke, Alph. List Cit. 2: 391, 395, 396, 399, 404, 465, 467, 473, 474, 477, 478, 480--482, 497, 508, 511--513, 516, 519--522, 525, 527, 538, 548, 570, 574, 577, 593, 604, 615, 645, 647, 648, & 650 (1948), 3: 658, 660, 665, 679, 692, 718, 721, 729, 741, 742, 747, 756, 760, 773, 776, 778, 779, 787, 789, 794, 796, 798, 825, 831, 841, 851, 867, 868, 870, 937, 941, 942, 963, & 978 (1949), and 4: 991--993, 1004, 1068, 1097, 1110, 1118, 1122, 1127, 1132, 1139, 1163, 1166, 1170, 1176, 1178, 1179, 1181, 1182, 1192, 1203, 1212, 1217, 1219, 1223, 1226--1230, 1239, 1240, 1245, 1255, 1256, 1258, 1259, 1288, 1289, & 1301. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 6--8, 10, 11, 18, 19, 24, 26, 28, 33, 42, 45--49, & 199. 1949; Moldenke, Phytologia 3:

73. 1949; Fernald in A. Gray, *Man. Bot.*, ed. 8, 1209, 1210, & 1612, fig. 1462. 1950; Thorne, *Castanea* 16: 43. 1951; Moldenke, *Phytologia* 3: 450 (1951) and 4: 66. 1952; Moldenke in Gleason, *New Britton & Br. Illustr. Fl.*, print. 1, 3: 126--129. 1952; Moldenke, *Phytologia* 4: 166. 1953; Thorne, *Am. Midl. Nat.* 52: 313. 1954; Moldenke, *Inform. Mold. Set* 48 Spec. [4]. 1954; Cooley, *Rhodora* 55: 288. 1955; Moldenke, *Inform. Mold. Set* 51 Spec. 4. 1956; Alain in León & Alain, *Fl. Cuba* 4: 281, fig. 121A. 1957; Moldenke in Gleason, *New Britton & Br. Illustr. Fl.*, print. 2, 3: 126--129. 1958; Moldenke, *Résumé* 9--13, 15, 22, 23, 30, 32, 33, 40, 49, 53--55, 57, 59, 322, 372, 374, 377, & 474. 1959; Moldenke, *Résumé Suppl.* 1: 2 & 4 (1959) and 2: 13. 1960; Moldenke, *Phytologia* 8: 143. 1961; Moldenke, *Résumé Suppl.* 3: 3, 6, 7, & 9 (1962), 4: 1--3 (1962), 5: 1 & 2 (1962), 6: 1 & 3 (1963), and 7: 1 & 10. 1963; Gleason & Cronquist, *Man. Vasc. Pl.* 579 & 580. 1963; Moldenke, *Phytologia* 8: 483, 487--489, & 491 (1963), 9: 52, 78, 93, 165, & 199 (1963), and 10: 140, 141, & 285. 1964; Moldenke in Shreve & Wiggins, *Veg. & Fl. Son. Des.* 2: 1239. 1964.

Illustrations: Marnock, *Floricult. Mag.* 5: pl. 54 [in color]. 1840; N. L. Britton, *Fl. Bermuda* 310. 1918; Fernald in A. Gray, *Man. Bot.*, ed. 8, fig. 1462. 1950; Moldenke in Gleason, *New Britton & Br. Illustr. Fl.*, print. 1, 3: 128. 1952; Alain in León & Alain, *Fl. Cuba* 4: fig. 121A. 1957; Moldenke in Gleason, *New Britton & Br. Illustr. Fl.*, print. 2, 3: 128. 1958.

Annual or perennial herbs, sometimes shrubby, to 2 m. tall, stoloniferous, branching at the upper half or third; roots fibrous; stems solitary, erect, simple or branched, hispidulous; leaves thick, 2 or 3 at a node, usually decussate-opposite, ovate to elongate-ovate, 3--13 cm. long, 2.5--5 cm. wide, petiolate, acute or obtusish at the apex, serrate-dentate along the margins, very scabrous or harsh-scabrous and commonly strigillose above, less scabrous and somewhat paler beneath and also hispidulous along the veins; spikes paniculately disposed, slender, pedunculate, copiously and closely flowered and fruited; bractlets ovate-acuminate, about half as long as the calyx, hispidulous; calyx to 2 mm. long; corolla hypocrateriform, varying from blue, bluish, or pale-blue to light-purple, purple, purplish-white, lavender, violet, lilac, pale-rosy, rosy, pink, pinkish, or even white, its tube scarcely, if at all, longer than the calyx, usually violet with white hairs in the throat, the limb 2--3 mm. wide, the lobes usually light lavender-pink, obtuse at the apex; anthers yellow, glandless; stigmatic surface of the pistil midway between 2 almost equal obtusish sterile lobes; fruiting-calyx 2.5--3 mm. long, ovoid, hispidulous, with the somewhat unequal lobes acutely connivent, diverging from the rachis of the spike by an angle of 45° or more; cocci ellipsoid, trigonous, 1--1.5 mm. long, faintly striate, reticulate above, longitudinally 2-striate on the back, the striae tending to disappear into reticulations, the commissural faces extending to the tip of the schizocarp, meeting sharply at right angles, muriculate and white-puberulent.

The type of this distinct species was collected by Julius Philipp Benjamin von Rohr (no. 35) somewhere "in America meridi-

onali", and is deposited in the herbarium of the Universitetets Botaniske Museum at Copenhagen. This rather widespread and distinctive species inhabits meadows, marshes and brackish marshes, swamps, pinelands, and maritime forests. It has been found in damp or marshy land, low moist or marshy ground, open swamp land, open or wet ground, cultivated ground, moist or moist sandy ground, moist rich soil, and rich sandy muck, in moist or wet sandy ditches, old fields, damp meadows, open sandy bogs, dry sandy lowlands, low pinelands, canyons, thickets, and moist ground at the edge of marshes, on river- and streambanks, open moist streambanks, sandbanks and canalbanks, lake shores and river bottoms, sandy beaches and the margins of rivers, about salt lagoons, along roadsides, creeks, and rivers, at the edge of hammocks, the inner border of brackish to fresh marshes, the borders or marshes and low woods, the edge of waterholes, and at highwater-mark on shores. Collectors report it from marshy areas, low marshy ground in open sun, brown marshy swamps, low or sandy woods, wet pinebarrens, damp soil near springs, salt marshes, grassy soil, lagoons, depressions among dunes and low areas in open forests back of dunes, among rocks, in hotel yards and low pigpens, in true shale barrens, pine woods, brush near creeks, and in low places or swampy country in general, at altitudes of 5 to 7800 feet, flowering and fruiting from February to December.

In Texas it grows in mostly rich soil of low ground, marshes, and swamps, and along the edges of streams and lakes, blooming from March to December, in the eastern and central parts of the state, from Newton and Jefferson Counties west to Uvalde and Reeves Counties. Head describes it as "scarce" in Jeff Davis County.

In California it is said to inhabit the Upper Sonoran Life Zone according to C. B. Wolf, while Johnston regards it as "introduced". In Louisiana it is said by Lemaire to be "uncommon with Quercus and Stenotaphrum" on the banks of lagoons. On Sapelo Island, Georgia, Duncan found it "in [the] open at side of roadway around freshwater lake fed by artesian springs". In Palm Beach County, Florida, it is described by Baker as "common everywhere in this part of the glades" and as "everywhere" by O'Neill; in Collier County it is "common in the everglades", according to O'Neill. Rankin reports it "common in fields" in Bermuda, Ekman says "common in swamps" in the Dominican Republic, and Wright says "introduced on roadsides" in Las Villas, Cuba. Webster & Proctor found it to be "common in the drier areas" of Jamaica.

Warnock reports the plant as "sparse" in Texas, while in Wakulla County, Florida, it is said by Redfearn & Kral to be "frequent in sandy peat in area recently drained and burned". Murrill (1945) describes it as having small, pink or white flowers, and growing in low ground, while Thorne (1954) reports it as "rare" in moist woods and swampy places. W. H. Hodge (1946) claims that V. polystachya is a cushion plant on the puna of the Peruvian Andes — a statement which is ridiculous, since neither V. carolina L. nor V. scabra Vahl (both of which species have a "V. polystachya")

in their synonymy) grows in Peru nor ever forms a cushion plant!

H. M. Pollard says for his collection of V. scabra from north of Veronica Springs, Santa Barbara County, California, made on August 8, 1957: "So far as I can learn, never before reported from Santa Barbara -- this from a favored collecting spot probably visited off and on for the past 100 years. When did the plant arrive?"

The Lindheimer 1077 collection cited below may be from either Comal or Comanche County, Texas, since its label merely states: "Comanche Spring; New Braunfels, etc." It was cited in Lundell, Fl. Texas 3 (1): 23 (1942) from Bexar County in error. Dr. S. W. Geiser believes that the Bigelow s.n. cited by Perry from Texas was not collected on the present Leon River as indicated on the label, but along the present Leona River in either Frio, Uvalde, or Zavalla County.

In Shreve & Wiggins (1964) it is stated that V. scabra grows "In mostly rich soil of low ground of marshes and swamps, and along the edges of streams and lakes, Lower Sonoran to Tropical Zones, from North Carolina to Florida and the Greater Antilles, west to southern California and south to Baja California, Coahuila, and Nuevo León."

Walpers (1845) classifies this species in his Section Verbenaca, Subsection Inermes, Group Foliosae, Subgroup Micranthae, and Secondary Subgroup Holophyllae, along with 22 other species. Schauer (1847) places it doubtfully in synonymy under V. urticifolia L. It should be noted here that the V. scabra of Marnock is actually V. rigida Spreng., while that of Muhlenberg is Phyla lanceolata (Michx.) Greene. Bailey (1935) reports that the seeds of V. scabra are handled by Kew. Thorne (1951) reports the species from Dougherty and Lee Counties, Georgia, but I've not as yet seen substantiating specimens. Bogusch 1235 is a mixture with V. xutha Lehm., while Fernald & Long 12453 is a mixture with V. engelmannii Moldenke. The C. C. Deam 65942 collection shows fasciation, while Ekman 933 has one spike fasciated-flattened for 4 inches. One of the Cory 38068 sheets in the University of Texas herbarium is inscribed "H. N. Moldenke 38068" in error. Rugel 639 in the United States National Herbarium has an original label inscribed "Ad fluv. St. Johns", to which someone has added "Ins. Cuba", obviously in error, since the Saint Johns River is in Florida. The Sapelo Island cited below is politically in McIntosh County, Georgia. Branton says "I found what is evidently polystachya x prostrata but it is not settled. Parish has it from me under No. 520 and it is also at Washington, D.C."

Small (1903 & 1913) uses the name V. polystachya H.B.K. for V. scabra, but this name is a synonym of V. carolina L. Common names reported for V. scabra are "rough vervain", "verbena cimarrona", and "white vervain". White-flowered specimens (perhaps worthy of a form name?) are Ahles & Leisner 32007, H. A. Allard

8270, W. Harris 9937, and Radford 28495.

Material of V. scabra has been misidentified and distributed in herbaria under the names V. carolina L., V. carolinensis Michx., V. caroliniana L., V. halei Small, V. hastata L., V. littoralis H.B.K., V. officinalis L., V. polystacha H.B.K., V. polystachya H.B.K., V. polystachys H.B.K., V. urticaefolia L., V. urticifolia L., V. urticifolia x hastata Gates, and Priva echinata A. L. Juss.

On the other hand, the Kearney & Peebles 10506, distributed as V. scabra, is V. carolina L.; Raven, Lewis, & Thompson 12180 is V. menthaefolia Benth.; and Ahles & Duke 48221 is V. urticifolia var. leiocarpa Perry & Fernald; Wiggins 9157 is V. orcuttiana Perry; T. S. Brandegees s.n. [Cañon Salado, June 1, 1897] and Edw. Palmer 153, distributed as V. polystachya, are V. menthaefolia Benth.; Ewan 17704 and I. L. Forbes s.n. [Colfax, VIII-20-27] are V. xutha Lehm.; and F. S. Blanton 6671 and O'Neill 6200 & s.n. [1 1/2 miles south of Leesburg, Sept. 26, 1929] are Hyptis mutabilis (A. Rich.) Briq. in the Lamiaceae.

Fernald, in Rhodora 38: 442--443 (1936), says that in V. scabra "the stigmatic surface lies between two almost equal sterile lobes....the fruiting calyx is strongly divergent and the nutlets reticulate above". He cites Fernald & Long 6863 from Surry County, Virginia, deposited in the Gray Herbarium.

Perry (1933) cites the following 65 additional specimens not as yet seen by me: NORTH CAROLINA: New Hanover Co.: Randolph & Randolph 1012 (G). FLORIDA: Broward Co.: Small & Carter 1072 (F). Collier Co.: O'Neill s.n. [Everglades, 27 Aug. 1925] (E). Columbia Co.: Quaintance s.n. [Lake City, 21 July 1893] (E). Dade Co.: Edw. Palmer 397 (E, G). Duval Co.: Curtiss 5111 (E). Franklin Co.: A. W. Chapman s.n. [Streets of Apa.] (E). Hernando Co.: A. S. Hitchcock s.n. [June--July 1898] (E). Lake Co.: G. V. Nash 1248 (E, G). Lee Co.: A. S. Hitchcock 269 (E). Manatee Co.: S. M. Tracy 6652 (E, G). Okeechobee Co.: E. J. Palmer 27462 (E). Orange Co.: Fredholm 5416 (E, G). Saint Johns Co.: Rugel 156 (E, F). MISSISSIPPI: Jackson Co.: C. L. Pollard 1191 (E, G); Skehan s.n. [Ocean Springs, 13 Aug. 1895] (E). LOUISIANA: Orleans Par.: Joor s.n. [New Orleans, 21 Oct. 1885] (E); Riddell s.n. [New Orleans] (G). Plaquemines Par.: Tracy & Lloyd 22 (E, G). TEXAS: Comal Co.: Lindheimer 618 (E), 1077 (E, G), s.n. [New Braunfels, 1847] (E). Harris Co.: Lindheimer s.n. [Houston, July 1842] (E). Jefferson Co.: E. J. Palmer 10692 (E). County undetermined: Bigelow s.n. [Leon River, Oct. 1850] (G). ARIZONA: Pima Co.: Pringle s.n. [Santa Cruz River, Tucson, 11 May 1881] (G), s.n. [banks of the Santa Cruz River near Tucson, 18 July 1884] (D, F, G). CALIFORNIA: Los Angeles Co.: A. Davidson s.n. [Los Angeles,

1892] (G); Lyon 6 (G). San Bernardino Co.: S. B. Parish s.n. [San Bernardino, Oct. 1891] (E); Parish & Parish 1043 (E, F), 11143 (G). County undetermined: Wallace s.n. (G). MEXICO: Baja California: C. R. Orcutt 1302 (E). Coahuila: Edw. Palmer 1040 (D, G). BERMUDA ISLANDS: Main: Brown & Britton 373 (D, G), 1631 (D); F. S. Collins 268 (G); A. H. Moore 2874 (G). Smith: A. H. Moore 2947 (G). CUBA: Las Villas: Combs 389 (E, G). Province undetermined: C. Wright 3659 (G). JAMAICA: W. Harris 11808 (E, G); A. S. Hitchcock s.n. [Port Antonio, Dec. 1890] (E); Lang 102 (D). HISPANIOLA: Haiti: Eyerdam 201 (G), 432 (G). PUERTO RICO: Read s.n. (D); Sintenis 1074 (E), 2010 (D). The collection which she cites as "Randolph 1012" is cited by me below as Randolph & Randolph 1012, while her "Leon & Edmunds 8719" is León & Edmund 8719. The Curtiss s.n., Keeler s.n., and Pollard 1191, which she cites from "NY", are all actually in the Columbia University herbarium, while the Pringle s.n. [banks of the Santa Cruz River near Tucson, July 18, 1884] which she also cites from "NY" is in the Barnard College Herbarium. She comments: "Verbena scabra, often confused with V. urticifolia, is easily separable by the very scabrous upper surface of the leaf and the rather conspicuous divergence of the fruit from the rachis of the spike. A quite distinctive feature is the position of the stigmatic surface apparently between two almost equal sterile style-lobes. This condition is somewhat approached in V. carolina, but in the other species examined the second sterile lobe has never been so definitely developed." She cites Fuertes 391 & 1758 from Haiti, but they were actually gathered in the Dominican Republic. The "Krig 3187" which she cites is an error for Roig 3187.

In all, 464 herbarium specimens and 2 mounted photographs, including type material or phototypes of all the names involved, have been examined.

Citations: VIRGINIA: Isle of Wight Co.: Fernald & Long 12785 (Au, St, Vi). Princess Anne Co.: Fernald & Long 10799 (H--68441, N, W--1810833), 12453, in part (Gu--27186). Shenandoah Co.: H. A. Allard 8270 (W--1829979). Surry Co.: Fernald & Long 6863 (N, Up, W--1682886). NORTH CAROLINA: Bladen Co.: Ahles & Duke 50975 (Hi--110657); Ahles & Leisner 33335 (Hi--104441). Brunswick Co.: Godfrey, Fox, & Beaman 50046 (No--26200). Carteret Co.: R. K. Godfrey 49809 (N); R. Gray s.n. [7/18/38] (H--50217); Lewis 229 (N). Chowan Co.: Ahles & Duke 47840 (Hi--104439); A. R. Moldenke 468 (Fg). Hyde Co.: A. C. Mathews s.n. [summer 1931] (Hi--13321). New Hanover Co.: Randolph & Randolph 1012 (Ba). Onslow Co.: Ahles & Leisner 32582 (Hi--104436). Pender Co.: Ahles & Leisner 32380 (Hi--104435). Perquimans Co.: A. R. Moldenke 466 (Fg). SOUTH CAROLINA: Beaufort Co.: Ahles & Bell 15630 (Hi--92865, Hi--92866), 18011 (Hi--92867). Charleston Co.: Ahles & Leisner 32094

(Hi--104440). Colleton Co.: C. R. Bell 4675 (Hi--92868). Dorchester Co.: Ahles & Leisner 32007 (Hi--104437). Georgetown Co.: Godfrey & Tryon 277 (Ca--956876, Gg--290714, N, W--1837183); Radford 28495 (Hi--92725), 31332 (Hi--92727). Horry Co.: Duke 49 (Hi--92726). Jasper Co.: E. O. Mellinger s.n. [May 22, 1959] (Hi--146718); Mrs. E. O. Mellinger 338 (Hi--134657). Saint Helena Island: Cuthbert s.n. [Oct. 1903] (Fl--21119). Sea Island: Cuthbert s.n. [Aug. 1884] (Fl--21136). Sullivan's Island: Biltmore Herb. 14892 (S). GEORGIA: Dapelo Island: W. H. Duncan 20258 (Lb--42772), 20268 (Au--167515, Gg--413460, Hi--106316, W--2262575). FLORIDA: Alachua Co.: Arnold & West s.n. [Gainesville, 17 Sept. 1937] (Fl--27112); Cuthbert s.n. (Fl--21134, Fl--21135); Hume, Arnold, & West s.n. [Gainesville, 3 July 1937] (Fl--27229). Brevard Co.: H. N. Moldenke 21503 (Hk, Ok, Sm, Ss, Z); W. H. Rhoades s.n. [Merrit, 4/2/28] (Fl--11930). Broward Co.: H. N. Moldenke 591 (E, Go, H--5477, N, S, Up, Ur), 599a (E, Go, N, S, Up, Ur); Small & Carter 1072 (N). Clay Co.: J. N. McFarlin 7898 (N). Collier Co.: Buswell s.n. [April 10, 1936] (Bu); C. C. Deam 65573 (Dm), 65856 (Es, N), 65942 (Mk, N), 66041 (Es, N); J. B. McFarlin 4650 (Mi); O'Neill s.n. [Everglades, 27 Aug. 1925] (Io--127944, Po--217260). Columbia Co.: Quaintance 209 (Fl--21131, Ga). Dade Co.: C. C. Deam 60864 (N); A. A. Eaton 496 (Rf); Elder 464 (H--69375); O'Neill s.n. [March 14, 1933] (I); Edw. Palmer s.n. [Biscayne Bay, 1874] (W--71951); J. K. Small 4020 (N, S), 8090 (S); Small & Small 4520 (N). DeSoto Co.: J. K. Small 8186 (N). Duval Co.: Curtiss 5111 (C, W--224492); Keeler s.n. [vicinity of Mayport and Jacksonville] (C); Lighthipe 406 (N); Rugel 639 (W--264614). Escambia Co.: C. T. Mohr s.n. [Pensacola, July 5, 1872] (W--771853). Flagler Co.: West & Arnold s.n. [Andalusia, 10/10/40] (Fl--32843). Franklin Co.: R. M. Harper 242 (N, W--1039060). Highlands Co.: Brass 15556 (W--2065618). Lake Co.: G. V. Nash 1248 (C, Ca--104867, Es, Mi, Mm--15401, S, W--228276), 1607 (Es). Lee Co.: Buswell s.n. [June 24, 1933] (Bu); C. C. Deam 65658 (Dm, Es, N); A. S. Hitchcock 269 (N, W--387303), s.n. [Myers, July--Aug. 1900] (Ka); H. N. Moldenke 972 (B, E, Go, H--5478, N, Ob, S, Up, Ur, W--1184413); J. P. Standley 427 (W--910802). Leon Co.: Berg s.n. [near Tallahassee] (N). Levy Co.: R. Kral 7803 (N); Watson & Murrill s.n. [Gulf Hammock, 6/18/39] (Fl--31455). Manatee Co.: S. M. Tracy 6652 (N, N). Monroe Co.: Meebold 27567 (Bi). Nassau Co.: Biltmore Herb. 1112c (Po--267670); P. O. Schallert 14103 (Hi--146050). Okeechobee Co.: Harshberger s.n. [Okeechobee, June 22, 1912] (Up--62867); Small & Small 4341 (S). Orange Co.: Fredholm 5416 (Io--76769, Po--127529, W--717215); Pieters 111 (W--511621). Osceola Co.: Fredholm 5944 (W--717355). Palm Beach Co.:

Baker s.n. [Belle Glade, Sept. 1925] (Fl--21118); W. B. Fox s.n. [Delray Beach, May 25, 1945] (We); O'Neill 852 (I); Small & Small 4337 (N, S, W--1737793). Pinellas Co.: M. H. Williams s.n. [Maximo, March 12, 1926] (H--26130). Polk Co.: C. C. Deam 64204 (No-21221); J. B. McFarlin 5930 (Gg--237854). Saint Johns Co.: Rugel 156 (Bm, W--512025). Saint Lucie Co.: Small & Small 4341 (N). Taylor Co.: R. K. Godfrey 53548 (N). Wakulla Co.: Redfearn & Kral 2490 (N). Observation Island: Small & Small 4403 (N). Saint Vincent Island: McAtee 1761a (W--514792). Sanibel Island: Orrok s.n. [Sanibel, March 20, 1915] (W--910360); S. M. Tracy s.n. [Sanibel Isl., 18 May 1901] (N). ALABAMA: Mobile Co.: C. T. Mohr s.n. (W--771852). MISSISSIPPI: Hancock Co.: Demaree 29588 (N). Harrison Co.: Demaree 32278 (Le). Jackson Co.: Demaree 28367 (Le); C. L. Pollard 1191 (C, W--271773). ARKANSAS: Drew Co.: Demaree 13696 (Sm), 24748 (Bm). Washington Co.: Herb. Univ. Texas s.n. [Fayetteville, 2/29/27] (Au), s.n. [Fayetteville, 7/29/27] (Au, Au). LOUISIANA: Orleans Par.: Brenning s.n. [17.6.1904] (B); T. Drummond s.n. [New Orleans, 1832] (Lu, Lu, N, S), s.n. [New Orleans, 1833] (Lu). Plaquemines Par.: Lloyd & Tracy 22 (N); Tracy & Lloyd 22 (Cm, W--383534). Saint Bernard Par.: R. J. Lemaire 866 (Tl). Tangipahoa Par.: Correll & Correll 9239 (H--78635, N). Terrebonne Par.: Arceneaux 383 (It). TEXAS: Bell Co.: Wolff 3243 (Tr--22252). Bexar Co.: Clare 782 (Ar--257309), s.n. [San Antonio, 26/7/1932] (Ew); Metz 782 (I). Brewster Co.: B. H. Warnock 8020 (Rf). Comal Co.: Lindheimer 618 (Ka), 1077 (Au, Br, Ca--147513, Me, Me, Me, N, Ok--10372, Up--48536, W--502450). Gonzales Co.: Bogusch 969 (W--1328539), 1235, in part (Po--161325); Tharp s.n. [6.27.27] (Au); Tharp & Barkley 13850 (Au, N). Hardin Co.: C. L. Lundell 14079 (Ld). Hays Co.: Ecology Class s.n. [San Marcos, 10.12.30] (Au); Stanfield s.n. [San Marcos, summer 1898] (N). Jeff Davis Co.: T. Head 16 (Au--122665, St). Jefferson Co.: Kirn 2139 (Po--158770, Wi); E. J. Palmer 10692 (Du--205609, S, W--1569398). Kerr Co.: G. L. Fisher 32217 (W--1624194), s.n. [Kerrville, Aug. 27, 1932] (Bt--33826, St); Normand s.n. [Frio R. w. of Hunt, 9.30.1929] (Au); Parks & Cory 23921 (Tr), 23983 (Tr), 23984 (Tr); Whitehouse s.n. [n. of Hunt, 9.1.30] (Au, Au). Kimble Co.: Strandtmann s.n. [Aug. 19, 1941] (Au). Liberty Co.: E. J. Palmer 8557 (Gg--182162, W--1531847). Newton Co.: Tharp s.n. [7-28-39] (Au). Presidio Co.: Hinckley 2134 (N, N), 3982 (N), 4122 (N). Real Co.: Cory 39708 (Au), 39709 (N, N), 42774 (Au); Parks & Cory 27415 (Tr--16228); Tharp, Follansbee, & Thompson 51-1663 (Au--122662). Reeves Co.: Parks & Cory 12044 (Tr), 12045 (Tr), 12046 (Tr). Travis Co.: C. C. Albers 40003 (Au, Au, Au, Au, Au, Au); F. A. Barkley 13366 (Au, N); Herb. Univ. Texas s.n. [Austin, 10-1-

34] (Au, Au); Strandtmann s.n. [Aug. 1, 1940] (Au); Tharp s.n. [Capt. Aldrich, 11/12/31] (Au, Au), s.n. [Austin, 7-18-41] (Ca--882811, Sm). Uvalde Co.: Parks & Cory 23877 (Tr). Val Verde Co.: Cory 38068 (Au, Au), 38069 (N, N). Walker Co.: C. C. Albers 39010 (Au). County undetermined: Collector undesignated L.25-538 [Skillman] (Sr); Cottle s.n. [Skillman, Aug. 23, 1931] (Sr), s.n. [Skillman, Aug. 29, 1931] (Sr); Havard s.n. [Peña Colorado] (W--155628), s.n. [Cottonwood Spg.] (W--221166); Lindheimer s.n. [southern Texas, 1849--51] (N), s.n. [1850] (Ka). ARIZONA: Co-chise Co.: Blumer U.213 (W--563590). Gila Co.: G. J. Harrison 4897 (To). Pima Co.: Pringle s.n. [banks of the Santa Cruz River near Tucson, July 18, 1884] (Bc, Br, Cm, Le, Po--158506, Up--17119, Vt, W). Pinal Co.: G. J. Harrison 4897 (W--1367744). Santa Cruz Co.: Pringle s.n. [1 July 1882] (C). CALIFORNIA: Los Angeles Co.: Braunton 532 (Ca--56839, Du--75594, W--465514), s.n. [Sherman, Nov. 1902] (Du--91157); A. Davidson s.n. [Los Angeles, 1892] (Du--91131); G. B. Grant 5057 (Du--75654), s.n. [Sherman, 2 Nov. '02] (Po--267667); Grinnell s.n. [Los Angeles river bottoms] (Du--86983); J. T. Howell 3174 (Gg--176993); McClatchie s.n. [near Pasadena, 12/17/1892] (N); C. B. Wolf 4093 (Ca--729498, Du--282943, Rs--5876, W--1845834). Orange Co.: L. M. Booth 1334 (Ca, Ca--537269, Po--201879, Ua--14737); Ewan 7731 (En, I); J. T. Howell 772 (Rs--655). Riverside Co.: Jaeger s.n. [July 15, 1921] (Du--140388); McClatchie s.n. [near Elsinore, 4/23/1892] (N). San Bernardino Co.: F. R. Fosberg S.4188 (N); I. M. Johnston s.n. [Upland, July 1917] (Po--4013), s.n. [3 km. south of San Bernardino, 2 Sept. 1924] (Po--47883); Munz & Johnston 11289 (Po--153388); S. B. Parish 5113 (Du--9539, W--414871), 5338 (N), 5919 (Ca--111249), 6441 (Au), 7149 (Po--126473), 9463 (Vi), s.n. [San Bernardino, Oct. 1891] (Ca, Ca--25152); Parish & Parish 1043 (Br, Du--91130, Io--92220); Roos 964 (Se--77353). Santa Barbara Co.: H. M. Pollard s.n. [north of Veronica Springs, Aug. 8, 1957] (Ca--176857, Gg--412067). MEXICO: Baja California: C. R. Orcutt 1302 (Ca--104823, Dt, Io), s.n. [7-15-85] (Ur), s.n. [7/15/1895] (Mi); Wiggins & Demaree 4734 (Ca--511510, Du--215362, Fs, Mi, N, Ob--68401, Po--213438, W--1587985), 4766 (Ca--511546, Du--219987, Fs, Mi, N, Ob--65512, Po--213545, W--1587979). Chihuahua: Edw. Palmer 364 (Pa). Coahuila: Edw. Palmer 1040 (Io, Pa, W--56173, W--1323117). BERMUDA ISLANDS: Main: Brown & Britton 373 (N, Up--45684, W--524936), 1631 (N); F. S. Collins 268 (N, W--717562); O. Degener 1304 (N), s.n. [July 21, 1921] (Ms), s.n. [July 24, 1921] (Ba); A. H. Moore 2874 (Gg--155393, N); Rankin s.n. [Walsingham, July 1, 1897] (Pr). Smith: A. H. Moore 2947 (Gg--155394, N). CUBA: Havana: Boldo 60 (Q), 112 (Q); Ekman 78 (S), 933 (S), 13107

(S); León 685 (N), 1343 (Ha, N), 13313 (Ha, N), 13440 (Ha, N), s.n. (Vi--4191); s.n. [Almendares] (Vi--4026); León & Edmund 8719 (Ha, N); J. T. Roig 3187, in part (Ha). Las Villas: J. B. Acuña Galé 17434 (Es, Es); Britton & Wilson 5771 (N); Combs 389 (Io--15353, Ka--61357, N, W--1484535); C. Wright s.n. [near Manacal, Trinidad, 1865; Herb. Sauvalle 1743] (Hv). Matanzas: Britton, Britton, & Shafer 292 (Es, N). Pinar del Río: Acuña & Zayas 19935 (Sm); Ekman 11333 (N, S); J. T. Roig 3187 (Es, N, S, W--1147101), 8493 (Es). Province undetermined: C. Wright 3659 [1865] (Pa, W--71966). ISLA DE PINOS: Britton, Wilson, & León 15256 (N, W--793637). JAMAICA: R. C. Alexander s.n. [22 Jan. '50] (N); N. L. Britton 1527 (N); Britton & Hollick 2704 (N); Fredholm 3175 (W--316019); W. Harris 9937 (N, W--656765), 11808 (Gg--31408, N, W--790870); Hartweg 1558 (Lu); C. R. Orcutt 2297 (Ca--430597); Webster & Proctor 5334 (S, W--2227703). HISPANIO-LA: Dominican Republic: Ekman H.13985 (S, W--1712018); Fuertes 391 (N, W--658353), 1758 (N, W--759366). Haiti: Ekman H.5 (N, S), H.7229 (S), H.8642 (S, W--1413151); Eyerdam 201 (W--1303294), 432 (Se--20945, W--1303498). PUERTO RICO: Britton, Britton, & Brown 6019 (N), 7037 (N); Eggers 996 (Br), 1152 (W--1323133), s.n. [Sierra de Luquillo, April 1883] (W--1159327), s.n. [1883] (Cp); J. R. Johnston 742 (N); Moldenke & Moldenke 19546 (Es, Lg, N); "F. L. S." 8359 (N); F. H. Sargent 695 (W--1558570); Sintenis 767 (S, Sg--16119, W--1323135), 1074 (B, N, N, Pa, W--71961, W--1323134), 2010 (Es, Po--63865); Stevens & Hess 4260 (N); J. A. Stevenson 5335 (W--1475340). WEST INDIES: Island undetermined: Swartz s.n. [ind. occ.] (S, S), s.n. [West-Indien] (S). LOCALITY OF COLLECTION UNDETERMINED: Swartz s.n. (S, S); Von Rohr 35 [America meridionali; Macbride photos 22778] (Kr--photo of type, N--photo of type), s.n. (S).

VERBENA SCABRELLA Sessé & Moc., Pl. Nou. Hispan., ed. 1, 1: 6 [as "Uerbena"]. 1887.

Bibliography: Sessé & Moc., Pl. Nou. Hispan., ed. 1, 1 [La Naturaleza, ser. 2, 1: App.]: 6. 1887; A. W. Hill, Ind. Kew. Suppl. 7: 249. 1929; Perry, Ann. Mo. Bot. Gard. 20: 343 & 356. 1933; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19 & 102 (1942) and [ed. 2], 33 & 199. 1949; Moldenke, Résumé 40 & 474. 1959; Moldenke, Résumé Suppl. 7: 3 & 8. 1963.

The original description reads: "Uerbena tetrandra spicis oblongis, foliis oblongis integerrimis caule simplici scabro. Fl. Mex. Ic. 16. Herba sesquidrantalis caule simplici scabro erecto. Folia alterna oblonga sessilia, integerrima scabra. Spicae terminales solitariae laxae oblongae. Flores purpurei. Bractee singulis floribus ternae subalatae ciliatae. Semina intra caosulam oblongam. Habitat in saxolis Cuyuacami circuitibus.

Floret Augusto. ①."

Nothing is known to me about this plant except what is stated in the original description. Perry (1933) says: "Apparently this species does not belong to the genus, but anything further regarding its identity is unknown to the writer." Dr. Maximo Martínez tells me that the type locality is probably Coyoacan, south of Mexico City, Federal District, Mexico.

xVERBENA SCHNACKII Moldenke, Phytologia 2: 150. 1946.

Synonymy: Glandularia peruviana x megapotamica Schnack & Covas, Revist. Argent. Agron. 12: 222 & 224--229, fig. 1B, 2, & 3 H--L, & pl. 12 A, B, D, & G. 1945. Verbena megapotamica Spreng. x V. peruviana (L.) Britton ex Moldenke, Résumé 369, in syn. 1959. Verbena peruviana (L.) Britton x V. megapotamica Spreng. ex Moldenke, Résumé 372, in syn. 1959.

Bibliography: Schnack & Covas, Revist. Argent. Agron. 12: 222 & 224--229, fig. 1 B, 2, & 3 H--L, & pl. 12 A, B, D, & G. 1945; Schnack & Gonzalez, Revist. Argent. Agron. 12: 290. 1945; Moldenke, Phytologia 2: 150. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 82. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 164 & 199. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2212. 1951; Moldenke, Am. Midl. Nat. 59: 361. 1958; Moldenke, Résumé 224, 296, 369, 372, & 474. 1959; Moldenke, Phytologia 8: 121 (1961) and 10: 133. 1964.

Illustrations: Schnack & Covas, Revist. Argent. Agron. 12: 225--227, fig. 1 B, 2, & 3 H--L, & pl. 12 A, B, D, & G. 1945.

This is the artificially produced hybrid between V. megapotamica Spreng. and V. peruviana (L.) Britton, first produced in Argentina in 1945. The two parental species grow together in at least two states of Brazil, in Paraguay and Uruguay, and in at least one province of Argentina, so it is possible that this hybrid may yet be found in the wild. In fact, some of the anomalous specimens distributed as one or the other of these species may actually represent this hybrid. It should certainly have considerable horticultural merit, as both parents are handsome-flowered. The hybrid is named in honor of Benno Julio Christian Schnack (1910--), contemporary specialist on the genetics of cultivated plants and on the taxonomy of the Verbenaceae.

Schnack & Covas (1945) describe the plant as follows: "El porte vegetativo del híbrido es intermedio respecto a ambos padres. Los entrenudos miden de 3 a 5,5 cm de largo. Hojas de 3 a 6,5 cm de largo, con pecíolo de 4 a 7 mm (Lámina XII, A); borde de la lámina simple a doblemente lobulado-aserrado. Brácteas florales de forma intermedia respecto a ambos padres (Fig. 2, A). Pubescencia del cáliz semejante a las de G. peruviana, con los pelos más ralos y oblicuos. Flores con la cara superior del limbo de color lila rosado [Este color parece deberse a una mezcla de pigmento derivado de pelargonidina con pigmento derivado de delfinidina. Por otra parte ya es conocido en Glandularia (Lawrence, W. J. C., and J. R. Price, Genetics and chemistry of flower colour variation,

Biol. Rev., Vol. 15, no. 1, 1940) que un gene que condiciona la producción de pigmento derivado de pelargonidina es incompletamente dominante sobre un gene que condiciona la producción de pigmento derivado de delphinidina, produciéndose en consecuencia una mezcla de los dos tipos de pigmentos.]; la intensidad del color es del mismo grado que en G. megapotamica, es decir el carácter diluido se ha comportado como dominante. Las papilas epidérmicas del centro de los lóbulos en la cara superior del limbo, son de forma intermedia respecto a ambos padres (Lámina XII, D). La cara inferior del limbo tiene pelos glandulosos raros, excepto en la extremidad de los lóbulos, alternando con pocos pelos simples. Tubo de la corola con pelos de tamaño intermedio respecto a ambos padres. Garganta de la corola con pelos moniliformes de color muy pálido. Limbo con los lóbulos de posición intermedia respecto a los padres (Fig. 1, B). Estambres superiores con lóbulos glandulosos apenas esbozados (Fig. 2, B). Estigma de forma y posición intermedia respecto a ambos padres (Fig. 2, C). Fertilidad del polen relativamente elevada (aproximadamente 65 o/o). En la meiosis del híbrido se observan irregularidades, como cadenas de cromosomas y cromosomas no apareados (Fig. 3: I, J, K y L), que indican que G. peruviana x G. megapotamica es un híbrido estructural heterocigota probablemente para una translocación simple, lo que sería la causa casi exclusiva de su esterilidad relativamente baja. Anteriormente hemos estudiado el híbrido G. santiaguensis x G. laciniata [=x V. covasii Moldenke] [Schnack, B., y G. Covas, Hibridación interespecífica en Glandularia (loc. cit.)], cuyo polen presenta una esterilidad próxima al 50 o/o, y cuyas especies paternas son relativamente poco diferentes desde el punto de vista morfológico. El estudio del híbrido G. santiaguensis x G. megapotamica [=x V. vaga Moldenke] indica en cambio una afinidad relativamente pequeña entre las especies paternas, según se deduce de su comportamiento citológico, traducido por otra parte en su polen completamente estéril; correlativamente las diferencias morfológicas son grandes entre G. santiaguensis y G. megapotamica. La fertilidad del polen y el comportamiento citológico anormal en una proporción baja en el híbrido G. peruviana x G. megapotamica, indican una afinidad estrecha entre G. peruviana y G. megapotamica. Paralelamente las diferencias morfológicas entre ambas especies paternas son relativamente pequeñas."

VERBENA SCHULZII Moldenke, Phytologia 3: 177--178. 1949.

Bibliography: Moldenke, Phytologia 3: 177--178. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 107 & 199. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Résumé 128 & 474. 1959.

Herb. 30--40 cm. tall; stems and branches acutely tetragonal, hollow, pilose-pubescent with short spreading hairs, somewhat less so in age, the hairs whitish or sordid; nodes annulate; principal internodes 2.5--7 cm. long; leaves decussate-opposite

and sessile; leaf-blades chartaceous, uniformly bright-green on both surfaces, lanceolate, 2.5--6 cm. long, 6--12 mm. wide, acute (or the upper only somewhat attenuate-acute) at the apex, somewhat clasping at the base, sharply and rather irregularly serrate along the margins, very scabrous above, scabridous and rather sparsely pilose beneath, especially along the larger veins; midrib slender, somewhat impressed above, prominent beneath; secondaries very slender, 6 or more per side, somewhat impressed above, sharply prominent beneath, ascending, slightly arcuate; veinlet reticulation rather obscure on both surfaces; inflorescence terminal, spicate; peduncles acutely tetragonal, 9--12 cm. long, rather abundantly spreading-pilose with stiff white hairs standing at right angles to the peduncles; spikes 5.5--8 cm. long, densely many-flowered; bractlets lanceolate-ovate, 5--7 mm. long, attenuate-acuminate at the apex, 1--1.5 mm. wide at the base, rather abundantly whitish-pubescent on the back and densely long-ciliate on the margins; calyx tubular, about 1 cm. long, 5-costate, abundantly white-pilose; corolla vivid-rose, the tube bright-rose, about 12 mm. long, densely pubescent on the outside above the calyx, the limb about 6 mm. in diameter.

The type of this rare species was collected by Augusto Gustavo Schulz (no. 284) — in whose honor it is named — in swampy ground on "tacurues" on a low campo at Colonia Benitez, Chaco, Argentina, on December 7, 1933, and is deposited in the Osten Herbarium at the Museo de Historia Natural at Montevideo. Thus far the species is known only from the original collection. Two herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: ARGENTINA: Chaco: A. G. Schulz 284 [Herb. Osten 23148] (F--photo of type, N--isotype, N--photo of type, Sg--photo of type, Ug--type, Z--photo of type).

xVERBENA SCORTA Moldenke, Phytologia 5: 133. 1955.

Synonymy: Verbena halei x prostrata Dermen, Cytologia 7: 170. 1936. Verbena halei Small x V. lasiostachys Link ex Moldenke, Résumé 365, in syn. 1959. Verbena lasiostachys Link x V. halei Small ex Moldenke, Résumé 368, in syn. 1959.

Bibliography: Dermen, Cytologia 7: 170. 1936; Moldenke, Phytologia 3: 467 (1951) and 5: 133. 1955; Moldenke, Biol. Abstr. 30: 1093. 1956; Moldenke, Am. Midl. Nat. 59: 361. 1958; Moldenke, Résumé 224, 365, 368, & 474. 1959; Moldenke, Phytologia 8: 121 (1961) and 9: 166. 1963.

This is the hybrid between V. halei Small and V. lasiostachys Link, produced artificially in cultivation by Dermen in Massachusetts in 1936. The two parental species do not actually grow together anywhere in the wild, as far as I am aware, so it is not very probable that this hybrid will ever be found in the wild, unless one of the parental species eventually invades the territory now occupied the other in the southwestern part of the United States. It does not seem very likely that the hybrid would ever be regarded as possessing much horticultural merit.

VERBENA SCROBICULATA Griseb. ex Lorentz, Veg. Nordeste Prov.

Entre Rios, ed. 1, 122 & 150, hyponym. 1878; Abhand. Kaiser. Gesell. Wiss. Götting. 24: [Symb. Fl. Argent.] 275—276. 1879.

Synonymy: Verbena hunzikeri Moldenke, Phytologia 2: 321—322.

1947. Verbena scribiculata Griseb. ex Moldenke, Alph. List Cit. 3: 913, sphalm. 1949.

Bibliography: Lorentz, Veg. Nordeste Prov. Entre Rios, ed. 1, 122 & 150. 1878; Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 24: [Symb. Fl. Argent.] 275—276. 1879; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39, 44, & 102. 1942; Descole, Gen. & Sp. Pl. Argent. 2: Icon. Pl. Argent. pl. 165. 1944; Moldenke, Alph. List Cit. 1: 16, 56, 96, 177, & 195. 1946; Lorentz, Veg. Nordeste Prov. Entre Rios, ed. 2, 122 & 150. 1947; Moldenke, Phytologia 2: 321—322, 338, & 339 (1947) and 2: 482. 1948; Moldenke, Castanea 13: 117 & 119. 1948; Moldenke, Alph. List Cit. 2: 364, 367, 368, 374—376, 378, 389, 442, 458, 534, 552, 575, & 599 (1948), 3: 660, 661, 666, 672—674, 688, 703, 704, 732, 745, 746, 748, 781, 800, 804, 858, 863, 869, 907, 909, 913, 916, & 922 (1949), and 4: 1088, 1091, 1165, 1166, 1207, 1250, 1256, 1293, & 1302. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94, 98, 99, 107, & 199. 1949; Moldenke, Phytologia 3: 75 & 76 (1949), 3: 289, 290, & 305 (1950), and 3: 468. 1951; Stellfeld, Trib. Farmac. 19 (10): 167. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Inform. Mold. Set 48 Spec. [4] (1954) and 49 Spec. 3. 1954; Moldenke, Résumé 120, 128, 224, 360, 362, 366, 369, & 474. 1959; Moldenke, Phytologia 9: 365—367 (1963) and 10: 174, 175, & 497. 1964.

Branching perennial herb, 0.25—1 m. tall, somewhat woody at the base, erect to decumbent or prostrate; stems erect or procumbent, tetragonal, several feet long, somewhat pilose above; branches numerous, slender, ascending or subprostrate, irregularly and loosely pilose-pubescent with whitish hairs of various lengths and standing out almost at right angles to the stems, glabrescent in age, tetragonal; nodes annulate; principal internodes 1.5—5 cm. long; leaves decussate-opposite; petioles elongate, very slender, 4—16 mm. long, densely spreading-pubescent like the younger branches; leaf-blades thin-chartaceous, rather uniformly bright-green on both surfaces or slightly lighter beneath, deltoid-ovate or oblong-lanceolate, 1.8—5 cm. long, 9—24 mm. wide, regularly narrowed from the broad base to the attenuate-acuminate apex, truncate or subtruncate and entire at the base, cuneately prolonged into the petiole, coarsely and rather irregularly sharp-toothed along the margins with antrorse teeth, incised below, sparsely pilose or hirtellous-scabrous above, densely pilose-pubescent beneath, less densely so in age and the hair then mostly concentrated on the larger venation; midrib very slender, plane above, slightly prominulous beneath; secondaries very slender, 4—6 per side, ascending, only slightly arcuate, obscure or very slightly subimpressed above, obscure or slightly

prominulous beneath; inflorescence terminal, 2--3 cm. long, depressed-spicate, many-flowered; peduncles slender, continuous with the stems, rather densely pilose-pubescent like the stems, often with some gland-tipped hairs; spikes subternate, contracted and to about 3 cm. long and 3.5 cm. wide during anthesis, soon elongating to 5 cm.; bractlets narrowly lanceolate, 2--4 mm. long and 1 mm. wide, usually half as long as the calyx or even shorter, glabrate except for the long-ciliate margins, sharply attenuate or acuminate at the apex; calyx narrow-tubular, 6--8 mm. long, short-pilose on the 4 parallel ribs, otherwise subglabrate, the 5 sharply acute teeth 1--1.5 mm. long, irregular; corolla hypocrateriform, varying from blue, deep-blue, or blue-violet to bluish-lilac, rose-lilac, purple, vivid-rose, or violet-white, rose-pink in drying, easily deciduous, its tube 1.3--1.8 cm. long, more or less puberulent or pilose on the outside, hirsute inside, the limb to 1.3 cm. wide, the lobes deeply emarginate or cordate at the apex; stamens 4, the lower ones subsessile, the upper ones about equaling the mouth of the corolla-tube; filaments short; anthers 2-celled; style surpassing the lower stamens; stigma with one lobe capitate and the other linear; cocci about 3 mm. long, half as long as the fruiting-calyx, linear, smooth below, densely scrobiculate above except for the commissure.

The type of this much misunderstood species was collected by Paul Günther Lorentz and Georg Hans Emmo Wolfgang Hieronymus (no. 244) near San Lorenzo, Jujuy, Argentina, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph no. 17445, now destroyed. The type of *V. hunzikeri* was collected by Armando T. Hunziker (no. 6812) -- in whose honor it is named -- in the alder (*Alnus*) formation along the highway between Alto del Clavillo and Alpachiri, Tucumán, Argentina, on September 18, 1946, and is deposited in the Britton Herbarium at the New York Botanical Garden.

Lorentz (1878) lists this species as "GR. n. sp." and calls it species No. 1157 of the "Flora Sub-Tropical", from San Lorenzo, but without formal description. It is obviously related to *V. phlogiflora* Cham. and *V. incisa* Hook., whose densely pubescent calyxes at once serve to distinguish them. Grisebach (1879) says "Proxima *V. phlogiformi* Cham. et *V. incisae* Hook., distincta calyce brevior, corolla extus pilosa et foliis etiam supremis longiuscule et abruptim petiolatis."

It has been collected in sandy mud near riverbanks or among stones near mountain streams, in moist sand of riverbanks, dense thickets, fertile soil, and grassy ground, in shade, on campos, along small streams, and among tall herbs in very wet soil, at altitudes of 300 to 1800 meters, flowering in April, June, July, and from September to December. It is said to be cultivated in Brazil. Eyerdam & Beetle report that "in shade it grows tall, in sunny spots it spreads and is more or less decumbent...common" in Salta; Jürgensen refers to it as "abundant" in Catamarca; and Vervoorst says that it is a "characteristic element of *Alnus* woods" in Tucumán. Material has been misidentified and distributed in

herbaria as V. pulchra Moldenke.

The plant figured in color as V. scrobiculata by Descole (1944) on my determination is actually V. peruviana (L.) Britton. Some 20 years ago I regarded V. scrobiculata as the correct name for what are now known as V. incisa Hook. and V. peruviana (L.) Britton, since at that time I had not seen a photograph of the type collection of Grisebach's plant. This is the reason for my misidentification of the plant on which Descole's excellent plate was based. The V. briquetiana f. campestris Osten, V. briquetiana f. silvatica Osten, V. chamaedryfolia hybrida Osten, V. chamaedryfolia α melindres f. siccanea Osten, and V. megapotamica var. truncatula Briq., reduced by me to V. scrobiculata in my Résumé 360, 362, & 369 (1959), actually belong in the synonymy of V. incisa Hook.

The following collections distributed as V. scrobiculata or so cited by me in the past are actually V. incisa Hook.: Archer 4666; Bailetti 58; Bertoni 1942, 2251, 2342, & s.n. [Herb. Inst. Miguel Lillo 28412]; Ekman 1978; Fries 1104; Garolera & Romero 140; Henz 33438; F. C. Hoehne s.n. [Herb. Inst. Bot. S. Paulo 8712 & 23061]; Hunziker 773; Leite 250; Lillo 3220; Lourteig 487; A. Lutz 1505; T. Meyer 9799 & 15871; Moldenke & Moldenke 19721, 19724, 19739, & 19754; Monetti 1623 & s.n. [Herb. Inst. Miguel Lillo 31354]; Montes 1091 & 2435; Pastore 2007; Peirano s.n. [Herb. Inst. Miguel Lillo 32193]; Reitz 882; Rodrigues 576 & 907; Sampaio 7675 & 7705; Schreiter 515 & 8104; A. G. Schulz 277 & 3988; Schwarz 2052, 3124, & 3162; and Venturi 378. The following are V. moricolor Moldenke: Herb. Osten 8469 & 22534; Lillo 18111; and Parodi 9179. The following are V. nana Moldenke: Brade 7002; Edwall s.n. [Herb. Inst. Bot. S. Paulo 15732]; T. Meyer 2943; and A. G. Schulz 1466. The following are V. peruviana (L.) Britton: Archer 4625; Castellanos s.n. [Herb. Mus. Argent. 33875]; and T. Rojas 3395.

In regard to the mixup in interpretation of names for this taxon, the following notes by Osten are of interest: "Zu Herb. C. Osten No. 8046. Verbena 'Briquetiana'. Cf. Briquet Verbenaceae Balansanae in Annuaire du Conserv. de Genève 1903/04 (VII-VIII) p. 288. 1904. Cf. Briquet in Arkiv f. Botanik II no. 10. 1904. Die Arbeiten von Chodat (Plantae Hasslerianae) und Briquet so weit sie die Sectio 'Nobiles' Schauer betreffen, sind voll von Irrthumen. Ich habe Briquet von 2 Jahren eine grossere Sammlung von Verbenen gesandt mit meinen Bemerkungen, habe aber nicht einmal Empfangsanzeige erhalten. An Hassler sandte ebenfalls, habe von ihm schriftlich die Nachricht, dass er mit meinen Ansichten ubereinstimmt (Hassler ist augenblicklich in San Bernardino, ich habe ihn leider nicht sehen können). Briquet behauptet, dass V. chamaedryfolia in Paraguay nicht vorkomme. Dis ist richtig soweit es sich um V. Melindres Gill. handelt. V. melindroides Cham. habe ich von Misiones und dürfte sie am Alto Paraná jedenfalls

auch in Paraguay vorkommen. Wenn man aber die rotblühenden Formen der Nobiles zu einer sp. coll. (turma, grex) V. chamaedr. zusammenfasst, so gehört diese Form 8046 jedenfalls dazu. Ich habe hier in Uruguay, in Paraguay, in Argentinien gefunden dass die Blütenfarbe der einzelnen Arten sehr constant ist, dass dieselbe Art rot, violett, weiss blüht, ist absolut ausgeschlossen (cf. Chodat in Plant. Hassl.). Soweit ich aus den Beschreibungen Briquet's ersehen kann, hat er diese Form zu phlogiflora (megapotamica var. Tweediana) als forma truncatula gezogen. Sie hat nichts damit zu tun. V. phlogiflora ist hockwüchsiger, mit grösseren Blüten deren Farbe immer lila violett ist, deren Blütenstände sich nach dem Verblühen nicht verlängern sondern kopfförmig bleiben. Ich habe diese Form 8046 in meinem Herbar als 'Briquetiana' bezeichnet und halte sie für den Uebergang von V. incisa Hook. zu der V. scrobiculata Griseb. (Symbolae no. 1735). V. incisa Hook. aus der Araucariazone, s/Br. Uruguay [nur fluss littoral!]; V. scrobiculata = Tucumanzone, 'Alles flusst!' I regard Osten 8046 as V. incisa Hook.

In all, 28 herbarium specimens of the true V. scrobiculata and 6 mounted photographs, including the types of phototypes of all the names involved, have been examined by me.

Citations: BOLIVIA: Tarija: J. West 8275 (Ca--565128). PARAGUAY: Ponder 7708 (Je--7708). ARGENTINA: Catamarca: Jørgensen 1298 [Herb. Osten 11351] (N, N, Ug, W--921951). Jujuy: Eyerda & Beetle 22302 (Ca--652223), 22598 (Ca--655675), 22673 (Ca--655626); Lorentz & Hieronymus 244 [Macbride photos 17445] (Kr--photo of type, N--photo of type); C. Skottsberg s.n. [near Urundel, 25/10/1948] (Go). Salta: Eyerda & Beetle 22626 (Ca--655595); Killip 39612 (W--1953926); Pierotti 1223 (S); Rufz Huidobro s.n. [Salazuti, 8/VIII/14] (Ca); Schreiter 11467 (Ca--164770, Ut--115410b); A. G. Schulz 3433 (Sz), 5185 (Cb); Schulz & Varela 5267 (S, Z); Venturi 5056 (W--1548948), 8673 (W--1591413); Willink s.n. [Herb. Inst. Miguel Lillo 106867] (Ca). Tucumán: A. T. Hunziker 6812 (Ba, F--photo, N, N--photo, Si--photo, Z--photo); Mexia 4332 (Ca--560598); Sparre 922 (S); Vervoorst 4260 (Le).

VERBENA SEDULA Moldenke, Phytologia 5: 229. 1955.

Bibliography: Moldenke, Phytologia 5: 229. 1955; Moldenke, Biol. Abstr. 30: 3551. 1956; Moldenke, Résumé 81 & 474. 1959; G. Taylor, Ind. Kew. Suppl. 12: 149. 1959.

Herb, about 1 m. tall; stems and branches tetragonal, rather conspicuously sulcate and ribbed, brownish, glabrous; nodes annulate, often with white setulose hairs; principal internodes 3.5--5.5 cm. long; leaves decussate-opposite; petioles slender, 1.5--2 cm. long on mature leaves, glabrous or with a very few setulose hairs; leaf-blades thin-chartaceous, brunnescent in drying, ellip-

tic, 4--8 cm. long, 1--2.7 cm. wide, acute at the apex, rather irregularly serrate from below the middle to the apex, glabrous on both surfaces or with a very few scattered setulose hairs; midrib slender, subimpressed above, prominulous beneath; secondaries very slender, about 6 per side, subimpressed above, prominulous beneath; veinlet reticulation rather abundant but often obscure, sometimes the larger parts prominulous beneath; inflorescence terminal, forming an open panicle about 20 cm. long and 15 cm. wide, many-branched, the small flowers borne in spicate fashion on the branches, the individual spikes to about 14 cm. long and 5 mm. wide, densely many-flowered, the flowers contiguous and partly overlapping; peduncles and inflorescence-branches slender, tetragonal, glabrous or with a few scattered setulose white hairs; bractlets subtending each calyx lanceolate-ovate, about 2 mm. long, acuminate, more or less ciliate-margined toward the base; calyx tubular, about 3 mm. long, sparsely pilosulous, its rim 5-toothed; corolla white, hypocrateriform, about 4 mm. long, its limb about 3 mm. wide.

The type of this rare species was collected by Robert I. Bowman (no. 81) at an elevation of 2500 feet on the north slope of the main peak on Indefatigable (Santa Cruz) Island, Galapagos Islands, on February 15, 1953, and is deposited in the herbarium of the University of California at Berkeley. The species is known thus far to me only from the original collection. Only 2 herbarium specimens, including the type, have been examined by me.

Citations: GALAPAGOS ISLANDS: Indefatigable: R. I. Bowman 81 (Ca--13499--type, 2--isotype).

VERBENA SESSILIS (Cham.) Kuntze, Rev. Gen. Pl. 3 (2): 257. 1898.

Synonymy: Verbena stellarioides β sessilis Cham., Linnaea 7: 265. 1832. Verbena sessilis Kuntze apud Thiselt.-Dyer, Ind. Kew. Suppl. 2: 191. 1904. Verbena stellarioides var. sessilis Cham. apud Moldenke, Prelim. Alph. List Invalid Names 48, in syn. 1940; Schnack & Covas, Bol. Soc. Argent. Bot. 1: 284. 1946. Verbena stellarioides var. sessilis (Kuntze) Cham. apud Rosengurt, Estud. Prad. Nat. Urug. 3: 236. 1943. Verbena stellarioides sessilis (Kuntze) Cham. apud Rosengurt, Estud. Prad. Nat. Urug. 3: 237. 1943. Verbena senilis Kuntze ex Moldenke, Résumé Suppl. 7: 10, in syn. 1963.

Bibliography: Cham., Linnaea 7: 265. 1832; Schau. in A. DC., Prodr. 11: 541. 1847; Schau. in Mart., Fl. Bras. 9: 187. 1851; Kuntze, Rev. Gen. Pl. 3 (2): 257. 1898; Briq., Arkiv Bot. 2 (10): 11. 1904; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 191. 1904; Briq. in Chod. & Hassler, Plant. Hassler. 10: 480. 1904; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1059. 1904; Hassler, Flor. Pilc. 101. 1909; Moldenke, Prelim. Alph. List Invalid Names 47 & 48. 1940; Moldenke, Alph. List Invalid Names 49 & 50. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39, 41, 44, & 102. 1942; Rosengurt, Estud. Prad. Nat. Urug. 3: 236--237. 1943; Schnack & Covas, Bol. Soc. Argent. Bot. 1: 284. 1946; Moldenke, Alph. List Cit. 1: 219 & 263 (1946) and 2: 457, 458, 533, 600, &

628 (1948), 3: 665, 688, 704, 749, 913, & 921 (1949), and 4: 1166, 1237, & 1295. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94, 99, 100, 107, & 199. 1949; Moldenke, Phytologia 3: 76 (1949) and 3: 377. 1950; Moldenke, Résumé 111, 118, 120, 128, 374, & 474. 1959; Moldenke, Résumé Suppl. 2: 13 (1960) and 7: 6 & 10. 1963.

A slender weak herb, 60 cm. to 1 m. tall, with the aspect of *Stellaria holostea* but somewhat more firm and with the leaves somewhat thicker; stems almost 1 m. long, about the thickness of the quill of a feather, mostly simple, sharply angled, the angles margined and subulate; leaves to 10 cm. long, "ad quatuor usque pollices elongata; inferiora caulis reliqui paulo longiora, foliis brevioribus instructa, infimis subsquamiformibus", 9 mm. wide, on smaller specimens shorter and broader, 4.5 cm. long and 9 mm. wide, sessile, subauriculate, very slightly decurrent, rather shortly attenuate at the apex, often serrulate, strigulose on the upper surface ("strigarum autem et dentium rudimenta et in var. α observabis identilatis speciei pignora"); bractlets shorter than the calyx; calyx tubular, about 6 mm. long, 5-veined, 5-toothed, the veins excurrent, unequally aristate, the upper bristles longer, 1 mm. long, the veins, bristles, and margins villous; corolla hypocrateriform, violet or indigo-violet to rose or even white, about 15 mm. long, surpassing the top of the spike, villous-sublanuginous and canescent on the outside, villous at the top inside and at the mouth, the throat spotted, long-tubular, the tube ampliate above, about 12 mm. long, the limb 5-parted, almost 10 mm. wide; stamens 4, didynamous, inserted slightly below the mouth of the corolla-tube; filaments short; anthers cordate-ovate; style setaceous, equaling the stamens, the apex clavate-thickened; stigma subapical, with a minute fleshy acute horn; cocci oblong, 4 mm. long, slightly thickened at the base, somewhat venose, the transverse veins elegantly areolate, the areolae quadrangular, "color illi griseus pallide nigrescens; carpello dorso octonervia, faciebus albidis angulo faciale nervoso."

The type of this poorly defined species was collected by Friedrich Sellow (no. 1563) in Brazil, and was deposited in the herbarium of the Botanisches Museum at Berlin, now destroyed, but is fortunately represented by Macbride's type photograph no. 17447. The *V. morongii* Britton formerly (1940, 1942) regarded by me as conspecific with *V. sessilis* seems, rather, to belong in the synonymy of *V. stellarioides* Cham.

Kuntze (1898) says: "Chamisso hat in Linnaea VII: 264 unter *V. stellarioides* 2 ganz verschiedene Arten, die in der Inflorescenz Bracteen, Blütthe wenig Unterschied zeigen, aber in der Blättern so sehr verschieden sind, dass ich sie als 2 Arten behandle: α *decurrens* Cham. = *Verbena decurrens* O. Ktze. Folia decurrentia integerrima margine revoluta aspera ceterum glaberrima. β *sessilis* Cham. = *Verbena sessilis* O. Ktze. Folia sessilia denticulata vel remote serrulata, supra strigulosa. Hierzu ex descr. *V. Morongii* Britton."